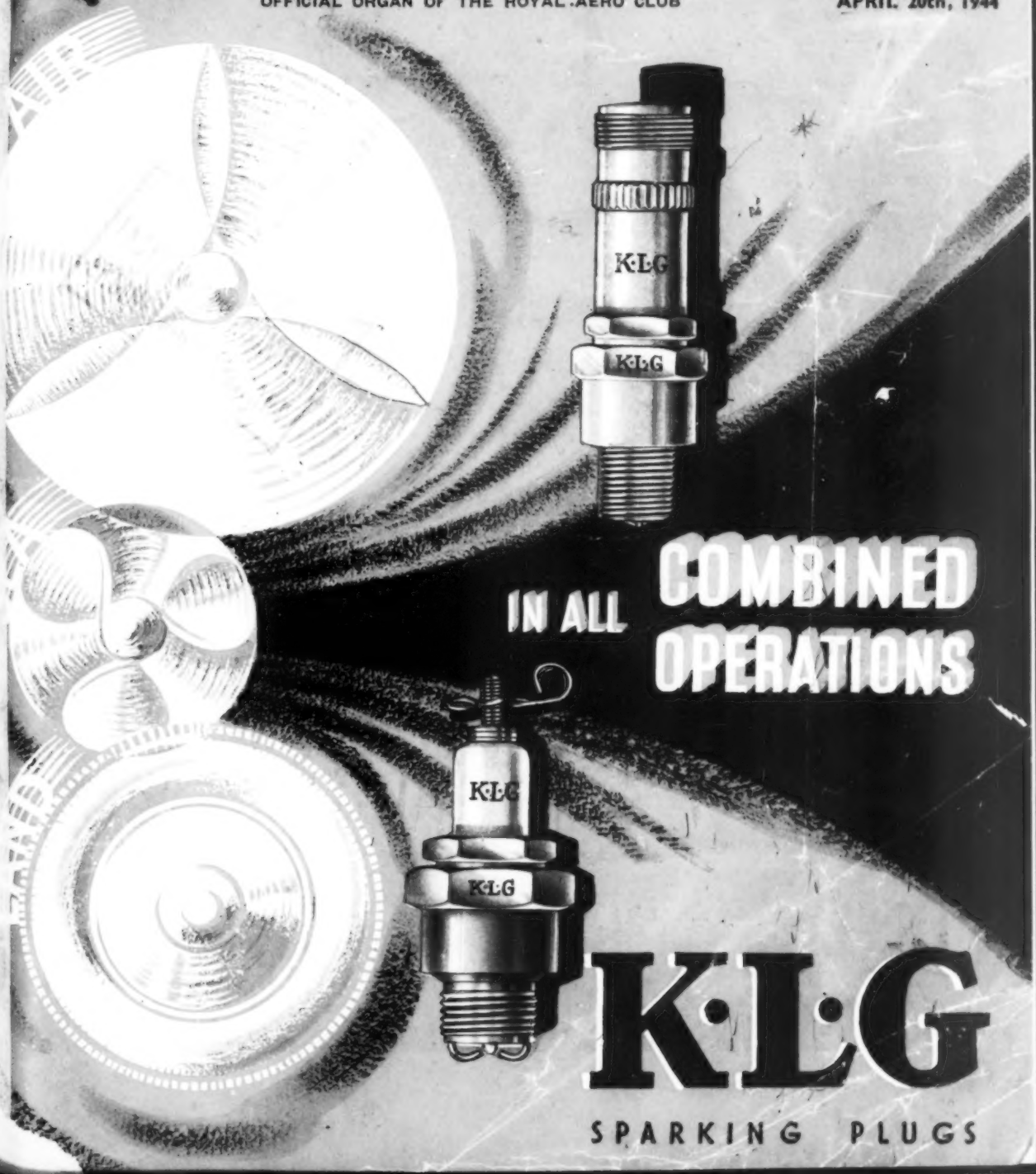
1/-

FLIGHT

and The AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

APRIL 20th, 1944



IN ALL COMBINED OPERATIONS

K·L·G

SPARKING PLUGS

Target for tomorrow~

HIGH SPEED, LUXURY
TRAVEL AIR LINERS
BUILT AND POWERED BY

"Bristol"

Target for today~

BEAUFIGHTERS IN ACTION AGAINST ENEMY SHIPPING, TROOP CONCENTRATIONS, NIGHT RAIDERS, COMMUNICATIONS, ETC.

THE BRISTOL AEROPLANE COMPANY LTD.

FLIGHT and The AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor
C. M. POULSEN

Managing Editor
G. GEOFFREY SMITH, M.B.E.

Chief Photographer
JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.

BIRMINGHAM, 2: GUILDHALL BUILDINGS, NAVIGATION ST. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).

MANCHESTER, 3: 260, DEANSGATE Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.

GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

Registered at the G.P.O. as a Newspaper.

No. 1843. Vol. XLV. April 20th, 1944. Thursdays, One Shilling.

The Outlook

Mine Laying

APRIL 13th this year was an anniversary; on that day in 1940 Bomber Command first began to lay mines in enemy waters. In the four years which have elapsed since the first flight by a mine-laying Hampden from a Group commanded by Sir Arthur Harris (as he now is) mine laying has been responsible for roughly one-tenth of the total effort of Bomber Command. Considerably more than 13,000 sorties have been flown, and it is known that as a result more than 500 enemy ships, probably totalling over one million tons, have been sunk or damaged. In fact, the actual sinkings may well be something like twice as heavy as that, for definite news of sinkings only comes in slowly by various routes, and many cases may never come to Allied ears at all. The average weight of British mines is 1,500 lb. They are ground mines, and may be either magnetic or acoustic.

It is not easy for newspapers to do justice to the work of the crews of the mine-laying aircraft, for there is nothing spectacular or sensational about the work. Occasionally the public hears of some outstanding result, such as the blocking of the Kiel Canal for several months through a ship laden with iron ore striking a mine in the canal.

That the work calls for meticulous accuracy in navigation by night, so as to ensure that the mines are laid in the right places, is known, but it is not common knowledge that the work is very dangerous. Actually the percentage of missing aircraft engaged in mine laying is little, if at all, below that of the average rate of losses among bombers engaged in the attack on Germany's production centres. Many of these losses must be due to the fire of the enemy, for the Germans have had to devote a large number of *flak*-ships to the special task of trying to counter our mine-layers. But it is also probable that at night not a few of our aircraft have hit the water when manœuvring in the dark at a very low altitude. Which of these causes has been responsible for most of our losses cannot be stated, for lost machines cannot report the cause of their own fates. The least that the British public can do is to honour the crews. They deserve as much credit as those who face the fiery defences of Berlin or Essen.

The Dividends

MINE laying from the air is a novelty of the present war. Of course, it takes many aircraft to lay as many mines in a given time as can be laid by one surface craft or submarine; but against that the aircraft can reach waters to which even a submarine cannot penetrate, and it is possible to "top up" a mine field before it has been thoroughly cleared by the enemy minesweepers.

As an instance of the effects of our efforts, the waters round Kiel are no longer used by the enemy for training and practice cruises by U-boats and other vessels. They have been driven away to the Gulf of Danzig, and even that is not beyond the reach of Bomber Command. Germany has done much to develop her coastwise traffic so as to ease the strain on her railways, and the present *modus operandi* is for one or two cargo ships with a strong escort to slip from port to port along the shores of the occupied countries, keeping well inshore. Mines drive them out from the coast into more open waters, where the light ships of the Navy can attack them by night and Coastal Command can get at them by day.

Convenient ports have sometimes been made unusable for days at a time by mines laid from the air, and neutral vessels in particular have shown a strong reluctance to enter harbours whose safety is in doubt.

Mine laying has always remained a function of

Bomber Command, which works in close touch with the Admiralty in selecting the Tom Tiddler's Grounds. The work of laying mines has never been handed over to Coastal Command, which is the organisation in the closest touch with the Admiralty. The demands of sea reconnaissance and of the campaign against U-boats have presumably always absorbed the energies of all the aircraft which Coastal Command could muster. Bomber Command, until quite recently, has always complained of a shortage of aircraft and of the various claims which postponed the full development of its offensive against German production. Nevertheless, it could always spare machines for this work more easily than Coastal Command could spare any, for the sea war had to take precedence of everything else. Now Bomber Command can send out Lancasters, Halifaxes, Stirlings and Wellingtons with multiple loads of mines, and yet can maintain its bombing offensive at full blast. So there are naval liaison officers with Bomber Command and at all the Groups concerned. The dividends paid by the mine-laying campaign have certainly been handsome.

Preliminary Discussions

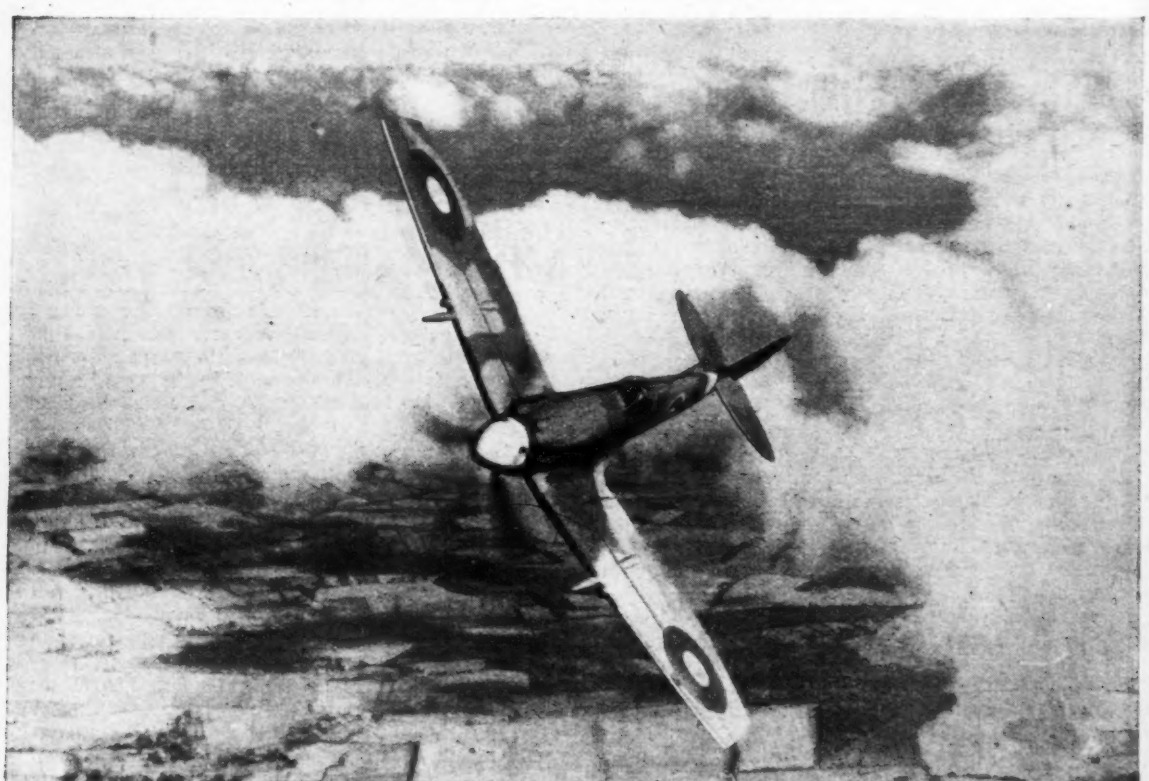
ALTHOUGH little enough has reached the general public in the way of details about the recent talks between Lord Beaverbrook, as representing the British Empire, and Mr. Adolph Berle and Dr. Edward P. Warner, the United States representatives, there is justification for believing that at the very least these talks will have cleared the air, and that ultimately a basis will be found upon which a world conference on commercial aviation can be established.

At the Press conference held after the discussions were finished, it became evident that concessions had been made by both sides. Lord Beaverbrook rather gave the impression that the Empire had made greater concessions than America, whereas Mr. Berle did not consider that to be the case. Without knowing all the facts it is impossible to judge, but two important conclusions are that agreement was reached on the point that there will have to be some form of international control of civil flying on the world routes, and Mr. Berle's assurance that America's lead in the number of transport aircraft would not be used unfairly. "That," Mr. Berle said, "would be considered a betrayal of an understanding entered into in good faith."

Particularly welcome was Lord Beaverbrook's statement that the United Kingdom had been in complete accord with all the Dominions. So long as that accord is maintained the future of Empire aviation need cause no undue misgivings.

CONTENTS

The Outlook	409
War in the Air	411
Spitfire Twelve	414
The Fairey Barracuda	416
Aircraft in Flying Attitudes	420
Here and There	422
Mosquito Genetics	423
The Auster IV	428
Correspondence	431
Service Aviation	433



FOR THE INNER CIRCLE: Manoeuvrability is an all-important aspect of the Spitfire XII which, with clipped wings and a Rolls-Royce Griffon engine, is a low-altitude fighter with an outstanding performance.

ARCTIC ATTACKERS : Part of the force of Barracudas which attacked the *Tirpitz* in Alten Fiord approaching their target over snow-covered mountains.

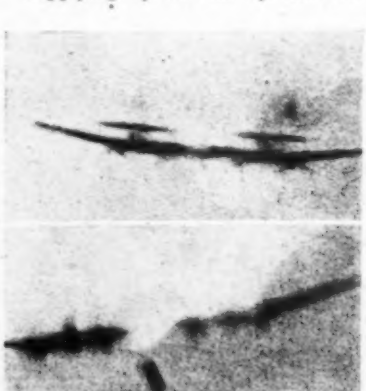
WAR in the AIR

Air Reconnaissance in Russia : The Fine Art of Supply in Burma : Spitfire Bombers in Action

IT has been remarked in these columns before now that the power which Russian Generals have shown of surprising the Germans must be largely due to the Red superiority in the air, which has given them the ability to reconnoitre the German positions thoroughly, while the enemy was left in the dark. This power of reconnaissance was used to the utmost in the recent sudden attack on the Germans in the Crimea. It was a slow process, and not only air observation was used. The position of German gun positions was carefully marked, as they gave themselves away by opening fire. When the time came, the overwhelming Russian artillery bombarded the enemy's defence lines and crushed all opposition. Red dive bombers knocked out many of the German heavy guns.

At the same time the shipping in the harbour of Sevastopol was bombed, as that at Odessa had previously been, and Russian long-range bombers visited the Rumanian port of Constanza. The Germans and Rumanians probably had hoped to evacuate many of their troops in the Crimea to that port. Not only the harbour, but also the railway junction and an oil plant were bombed, and extensive fires are said to have broken out.

Supplying by air has by now become a speciality of the South-East Asia Command. The force of West African troops which arrived in Burma some time ago is now fighting on the Kaladan river, and acting as flank protection for the operations in the Mayu peninsula. It, like General Wingate's airborne force, is fighting without ground connection to any base, and has been supplied entirely by air. These facts give one some idea of the strength of the air transport force behind the Anglo-American front. The transport aircraft, it is understood, are all American and operated by the U.S. Army Air Forces. The day has not yet come when a 17-inch howitzer can be flown up to a battle front, but certainly supply by air has been developed to an extraordinary degree of late.



"DIVIDED WE FALL" : Two pictures from the recording cameras of the Mosquitoes which shot down the glider-towing Siamese-twin Heinkel IIIs over France recently.

Mention in S.E. Asia communiqués has recently been made of an Air Commando force, which has been quite active, though its precise functions have not been described.

While dealing with S.E. Asia, it is interesting to read that the Royal Navy has established a training establishment in Ceylon where Sinhalese

WAR IN THE AIR

and Tamils are being trained as ground crews for the Fleet Air Arm. Tamils are really natives of Madras, and that race provided the Sepoys of the old Madras Pioneer regiments and Corps of Sappers and Miners, who always held a high reputation for the quality of their technical work.

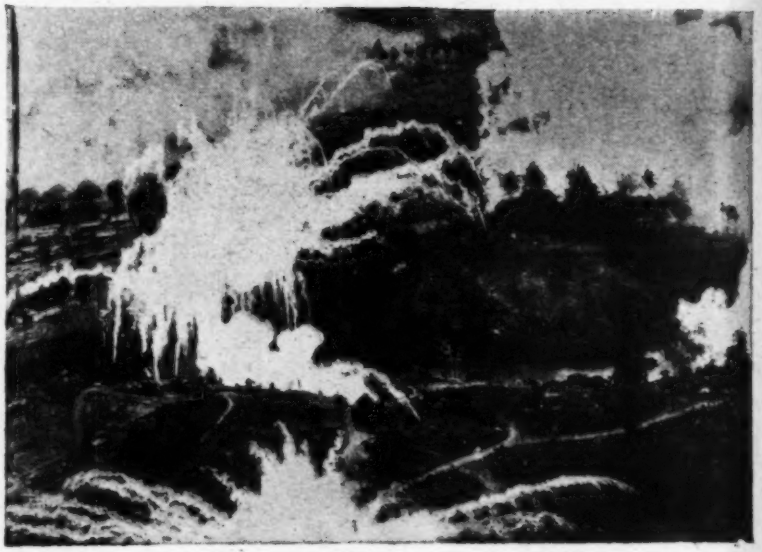
German Air Strength

SOME time ago it was announced that during last year the Germans had contrived to increase the fighter strength of the *Luftwaffe* by 1,000 first-line machines. It has since transpired that in the five months from November to March an addition of some 250 fighters has been made. Some of these would be included in the figure of 1,000 for last year. Neither figure is to be taken just at its face value. For every increase of so many first-line machines, there must be a due proportion of immediate reserves in the squadrons. That is a necessity even in peacetime, as some machines and engines are regularly unserviceable from slight accidents or through undergoing periodical overhauls. When war casualties are added, it is desirable to increase the proportion of reserves.

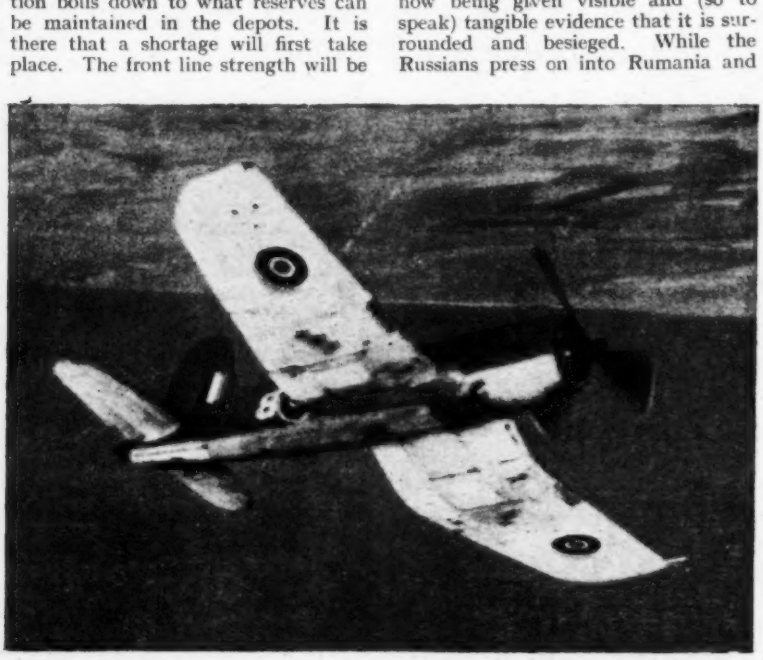
It says much for the German effort that this increase should have been made in the face of the Anglo-American attacks on their fighter factories. But for these attacks, the increase would doubtless have been a good deal larger. Ultimately the question boils down to what reserves can be maintained in the depots. It is there that a shortage will first take place. The front line strength will be kept up to scratch as long as possible, but when the depots have to issue machines to the squadrons faster than they can replenish the stocks from the factories, then the final defeat of the *Luftwaffe* will be near at hand.

The latest transformation to appear in Northern Europe is a Spitfire bomber. It has won high praise from the Canadian pilots who first flew the type across the Channel.

Hitler's "Fortress of Europe" is now being given visible and (so to speak) tangible evidence that it is surrounded and besieged. While the Russians press on into Rumania and Slovakia, the bombers of the other Allies have been flying in from West, North, and South to strike at munition factories and railway junctions which for the past four years must have thought themselves perfectly safe from any of the horrors of war. Those horrors, the people of Germany, Hungary, and Rumania had been taught to believe, were reserved entirely for the opponents who were wicked enough and foolish enough to resist the might of Germany and her allies. In 1940 few if any of the inhabitants of Hungary could have dreamed of British and American aircraft flying up from the Mediterranean area (and from Italian bases, of all unexpected places!) to bomb factories, airfields and railways at places rejoicing in such names as Tokol, Duna, Vecses, and Brod. Four years ago the workers in those factories and railway junctions must have felt themselves as free from disturbance as the people of Berlin were in the last world war.



STOKING UP: Phosphorous incendiary bombs, dropped by the U.S.A.A.F., bursting on a Japanese occupied airfield at Rabaul, New Britain. These incendiaries and fragmentation bombs play havoc at dispersal points.



ABBREVIATED PIRATES: The Vought Sikorsky Corsairs in service with the Royal Navy have clipped wing-tips. This may be for aerodynamical reasons or from consideration of space on carrier lifts or head room in hangars.

The Bomber Offensive

STRIKING from Great Britain, Bomber Command never tires; and the U.S. Army Air Forces, which now actually outnumber the resources of Bomber Command in Britain, strike crippling blows day after day and force the *Luftwaffe* against its will to send up all the fighters it can muster to try vainly to hold off the raids.

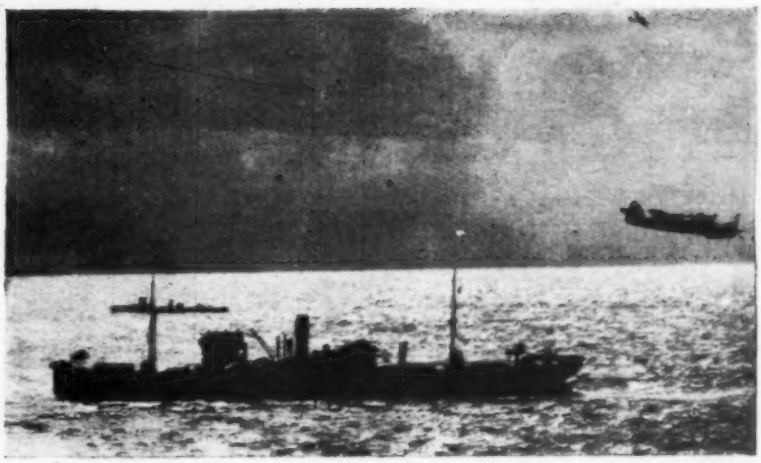
Perhaps the most surprising development has been the part now played by the long-range fighter. One day last week a striking force of some 500 Fortresses and Liberators was accompanied by escorts of Mustangs, Lightnings, and Thunderbolts which totalled more than 1,100 machines. Of course these were not all in action at the same time and place. An

WAR IN THE AIR

ENEMY AIR LOSSES TO APRIL 15th

	Over G.B.	Continent	Middle East	Italy
April 2	0	0	0	116
" 3	0	0	0	26
" 4	0	1	0	49
" 5	0	2	0	40
" 6	0	1	0	28
" 7	0	0	0	31
" 8	0	0	0	2
" 9	0	0	0	0
" 10	0	1	0	1
" 11	0	8	0	5
" 12	1	3	0	31
" 13	2	2	0	56
" 14	0	4	0	6
" 15	0	0	0	16
	3	22	0	407

Totals: West, 8,160; Middle East, over 5,845; North-West Africa and Italy, 5,323



TEAM WORK: The last big supply ship left to the Germans in the Aegean Sea was recently sunk while on its way to Crete. Despite an air cover of Ju 88s., Me 109s. and Arados, the 75mm. cannon-armed Mitchells with anti-flak and torpedo Beaufighters pressed home a successful attack

elaborate system of reliefs has been worked out, by which a force of fighters flies at economical cruising speed to some point where it can take over from another escort whose remaining fuel just suffices to get the machines back home. In this way the bombers were escorted right down into Bavaria, and the German fighters which attempted to dispute their passage paid for their temerity by heavy losses. Bavaria must once have seemed quite as safe a region as Hungary.

H.Q. in Ceylon

THE move of Admiral Mountbatten and the H.Q. staff of the South-East Asia Command from New Delhi to Kandi, in Ceylon, seems highly significant. Kandi, by the way, is a hill station in the centre of the island, though it is not the summer headquarters of the Ceylon Government, which is Nuwara Eliya (pronounced Newraylia).

The real centre of interest in Ceylon, however, is Trincomali, which is a large and highly important naval base. The Prime Minister has let it be known that a formidable fleet has been gathered together in the Indian Ocean, and its base can be nowhere except Trincomali. Ceylon comes within the S.E. Asia Command, which India does not. The land operations against the Japanese in northern Burma must be based on India.

BRITISH & U.S. AIR LOSSES to APRIL 15th

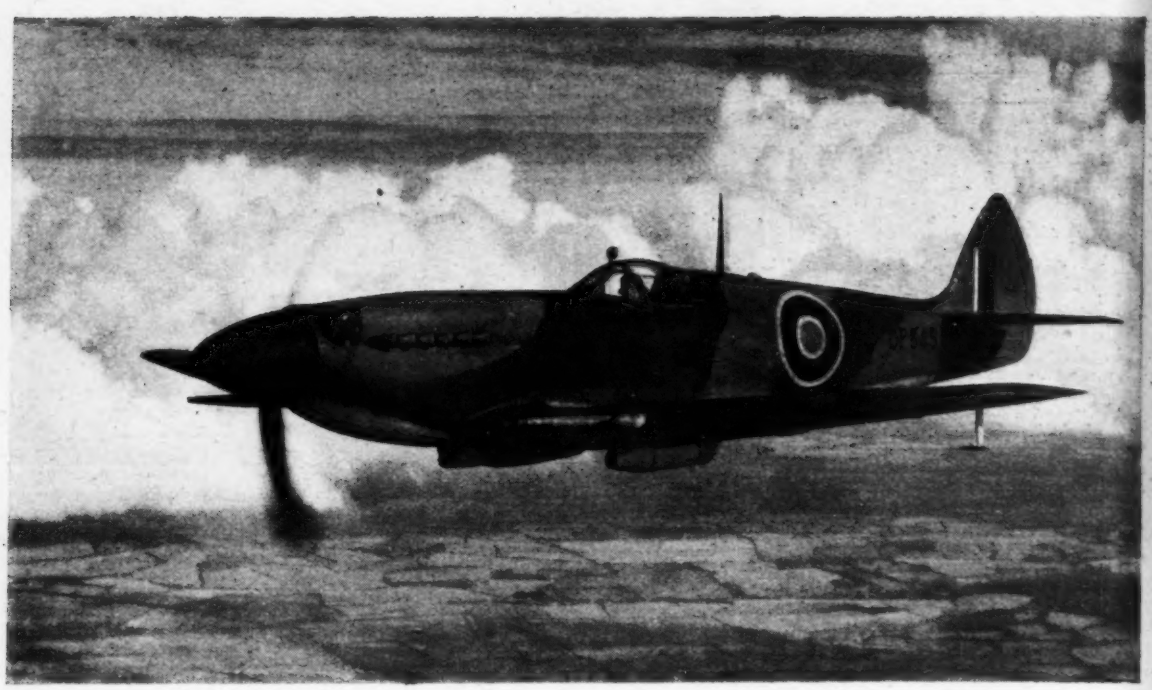
	Over G.B. A'crft.	Continent B'brs.	Continent F'trs.	Middle East A'crft.	Italy A'crft.
April					
2	0	0	0	0	33
3	0	0	0	3	13
4	0	0	0	0	12
5	0	1	8	0	12
6	0	1	2	0	10
7	0	0	0	0	10
8	0	34	25	0	0
9	0	40	10	6	0
10	0	27	8	0	2
11	0	76	20	0	1
12	0	7	5	0	14
13	0	38	9	0	19
14	0	0	2	0	5
15	0	0	30	0	21
	0	224	119	9	152

Totals: West, 11,264; Middle East, about 2,397; North-West Africa and Italy, 2,063.

It must, however, have been obvious to all observers for a long time past that to reconquer Burma by means of Army operations from the north would be a long and not easy task. The alternative is a sea-borne invasion and naval operations which will deny the use of Rangoon and other ports in the south of the country to the Japanese; and these must start from Ceylon. New and large British aircraft carriers are known to be in the Indian Ocean, and they will have a supremely important part to play in all such operations, until such time as we have seized airfields in southern Burma and can move strong contingents of the Eastern Air Command down on to them. For some time past the Japanese have been unable to stand up to the British and Americans in the air in northern Burma, and they are not likely to prove more formidable in the south. Nor is much opposition from the Japanese Navy to be feared.

One object of a blow in the latitude of Rangoon must be to cut the land line by which the Japanese have been receiving supplies from Siam and Indo-China, and a strong body of the Eastern Air Command can be trusted to make that line very precarious, once it has established convenient bases; and we may hope that once an expeditionary force gets ashore there it will be able to set up an even more permanent block on that line. In fact, another combined operation by all three Services is clearly in preparation, with carriers providing the advanced guard, the naval warships seizing the sea glacis, and the Eastern Air Command and the Army striking the decisive blow.

NOW GONE OFF: The 8,000lb. bomb in the background has gone off somewhere in Germany and the central figure, Mr. Geoffrey Smith, managing editor of *Flight*, has gone off on a Government mission to the U.S.A. On the left is Wing Cdr. Samson and on the right Group Capt. Heard.



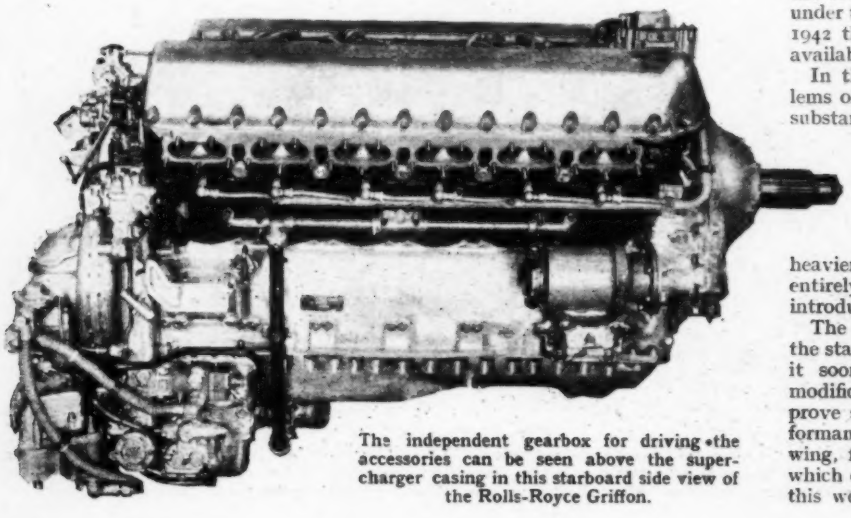
Spitfire Twelve

First Details of R.A.F.'s Low-altitude Fighter : Outstanding Performance with R.-R. Griffon Engine and Cleaned-up Airframe

ALTHOUGH it was first flown in prototype form as long ago as 1941, and has been in operational service with the R.A.F. fighter squadrons for some time, it has not previously been permitted to make reference to the Spitfire XII which, powered by the Rolls-Royce Griffon, has been developed to give outstanding performance at low altitudes. It thus forms a valuable team-mate of the Spitfire IX which takes care of the enemy at the other end of the altitude scale.

The fact that considerable prominence has been given, of late, to the ever increasing altitudes at which fighter performance was being maintained by two-stage and turbo superchargers, may well have encouraged the notion that air supremacy would depend on this alone. Such is by no means the case, for it was realised even before the Battle of Britain that the low-altitude fighter would have an equally important part to play and that it might, in fact, become one of the deciding factors in the air war.

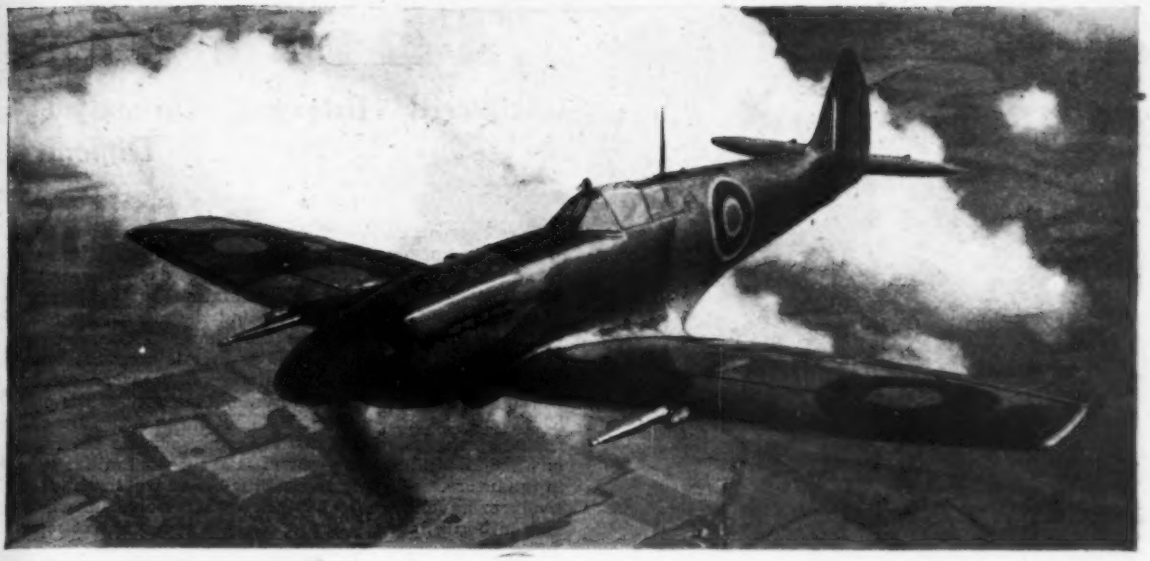
Thus it was in 1940 that Vickers-Supermarine and Rolls-Royce got together in close co-operation to evolve something really "hot" in the way of single-seater, low-altitude fighters; as already stated, the prototype was first flown the following year—quick work, even under the forcing frame of war—and in 1942 the first production version was available for the R.A.F.



The independent gearbox for driving the accessories can be seen above the supercharger casing in this starboard side view of the Rolls-Royce Griffon.

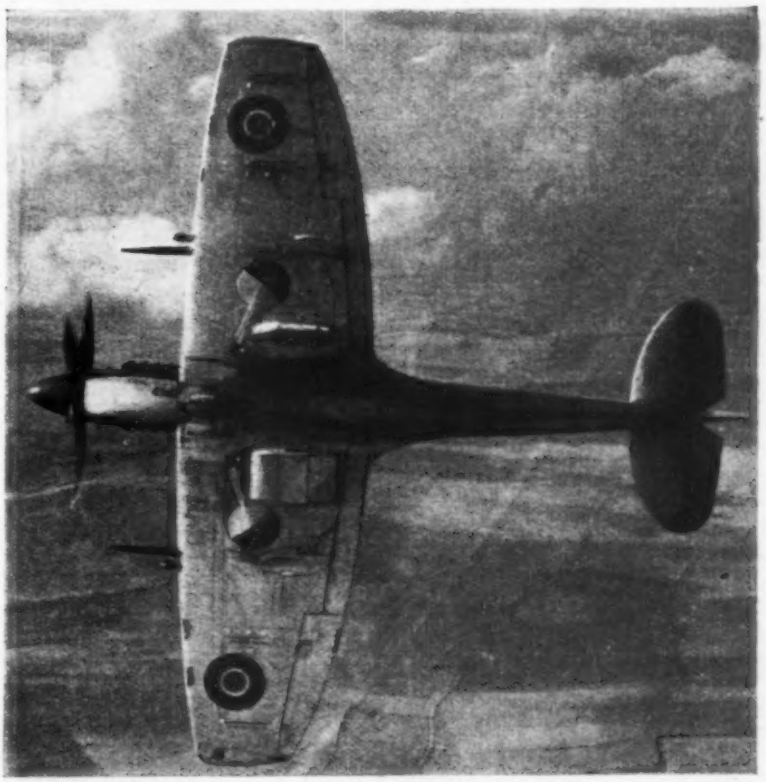
In the meantime some acute problems of design had been solved. The substantially increased size and weight of the new engine in comparison with the Merlin necessitated modifications to many sections of the aircraft: a new fuselage, reinforced and strengthened to support the heavier engine, was designed, and an entirely new type of engine mounting introduced.

The prototype had been fitted with the standard type of Spitfire wing, but it soon became evident that some modification was called for here to improve still further the machine's performance. The answer was the clipped wing, first seen on the Spitfire III of which only a few were built, and with this went an improved rudder to en-



THE LOW-DOWN : Recognition features of the Spitfire XII low altitude fighter are clearly shown in these two flying photographs.

SPITFIRE TWELVE



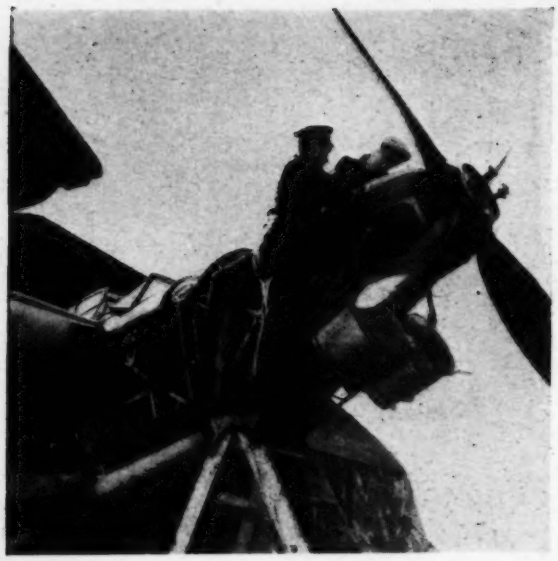
sure maximum manœuvrability. As the accompanying photographs show, this new rudder design has increased area and aspect-ratio and its changed outline is obvious from the pointed apex.

Still in search of higher m.p.h. by every possible reduction in drag, especially parasite drag, the lines of the cockpit cover and the engine cowling were modified, achieving a greatly improved aerodynamic form, while the fixed tailwheel was replaced by a fully retractable type. From the very first, the "Spit XII" proved to be highly successful, its greatly improved manœuvrability, increased speed and rate of climb at low altitudes giving it a combat performance that is probably not equalled and most certainly not exceeded by any other fighter flying to-day.

Griffon Features

While the cleanness of the airframe contributes generously to this gratifyingly high standard of performance, it is primarily bestowed, of course, by the Rolls-Royce Griffon engine. This remarkably compact power-unit was described and illustrated in *Flight* of March 9th, but a brief review of its most notable characteristics will refresh the reader's memory and will therefore not be out of place here. Following the well-proved general arrangement of Rolls-Royce aircraft engines, the Griffon is a twelve cylinder liquid-cooled Vee type and is in the 2,000 h.p. class. It is larger than the famous Merlin series, having a piston displacement of 36.7 litres as compared with the Merlin's 27 litres and is, in fact, of the same dimensions as the "R" type Rolls-Royce which won the Schneider Trophy Race in 1931. It employs the same type of mechanically driven two-speed supercharger as fitted to the Merlin XX, but an interesting departure from previous practice is the provision of an independent "remote" gear box on which is mounted the various accessories required to operate such things as the undercarriage retraction gear, wheel brakes, flaps, blind-flying instrument panel and the electric generator.

Students of aircraft recognition will be mainly interested in the square tips of the clipped wings, the pointed apex of the fin and rudder, a single radiator under the starboard wing and a small intake beneath the port wing as on the Spitfire V. The spinner is larger and there are two streamlined bulges on top of the cowling and the tailwheel retracts.



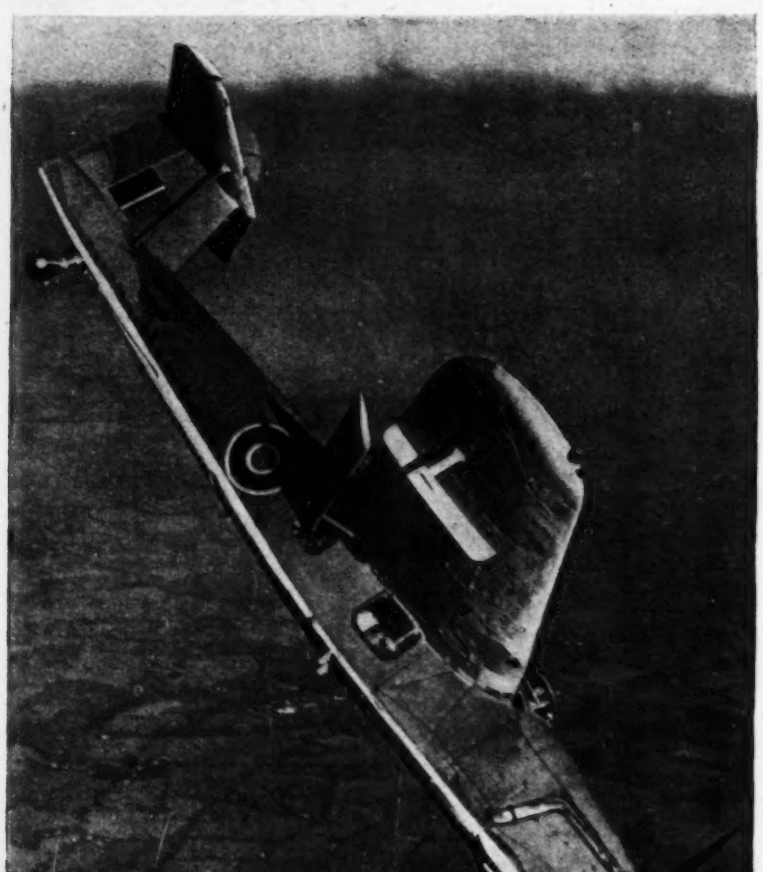
The Faire

Chequered History of Unjustly Critic... Difficult De...

By ...REN

IT will come as a surprise, and perhaps a shock, to large numbers of aeronautical enthusiasts to realise that the greatest industry in Great Britain to-day—the aircraft industry—has no direct representation in Parliament. There are no "Aircraft Lords" and the nearest approach to an aircraft constructor in the House of Commons is, perhaps, Sir Oliver Simmonds, of aircraft accessory fame.

This is an astonishing state of affairs. Nearly 2,000,000 workers form the production pyramid supporting the peak of aircraft output. Something like 15,000 firms are concerned in this mighty industrial endeavour, on the issues of which depend not only our martial success but our stake in the future. It is known that the House will listen attentively to anyone who can speak with personal knowledge and authority, yet we have not—so far—any direct representation for this vast army of workers.



The immediate cause of this state of affairs is that the aircraft constructors have been much too busy since 1936 on expansion programmes coupled with the enormous problems of dispersal of industry against concentrated bombing. Secondly, there are many who hold that the serious business of engineering does not consort with the game of politics. The result has been a lack of authoritative statement in either House on aircraft production details and, in turn, some remarkable paragraphs for Hansard.

Vindication

Probably no aircraft has come in for such a belting in Parliament as the Fairey Barracuda which, in its brilliant debut against the battleship *Tirpitz*, has straightway crowned the efforts of tens of thousands of workers with indisputable success. The odium shed at first on the Barracuda has had a boomerang effect. The *Tirpitz* attack has shown that a handful of these aircraft (ably escorted by seaborne fighters which so many have described as inferior in their view to land-based aircraft) has done damage which is comparable to large-scale fleet actions (cf. *Scharnhorst*) and prolonged air bombing by land-based bombers (cf. months of action without appreciable result against *Scharnhorst*, *Gneisenau* and *Prinz Eugen* at Brest).

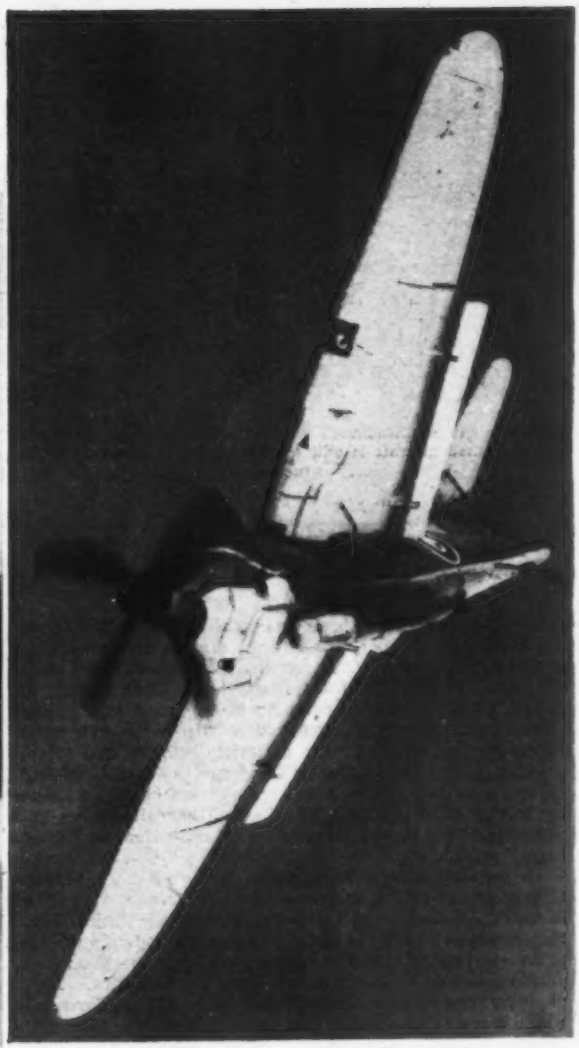
Couple the *Tirpitz* action with those at Tarento, Matapan, Oran, Madagascar, Malta, and against *Bismarck*, and the inescapable conclusion is reached that (a) the Fleet Air Arm is of first importance in sea warfare, and (b) it has returned the richest dividends of any armed force in the world on the

(Top Left) Attending to the Rolls-Royce Merlin XXXII and Rotol four-bladed airscrew. The semi-sunken long exhaust pipes are of interest. (Left) A Barracuda in a 52 degrees dive. Note the anti-lift attitude of the flaps when used as diving brakes.

Barracuda

...craft : Reasons for Delays : Some ...atures Solved

By ...REN



Two spectacular photographs of a Barracuda showing its paces. For normal flying and aerobatics the flaps take up a neutral position.

ratio of size to results. It also establishes the torpedo-bomber as probably the most formidable weapon yet devised.

Who is to champion this cause, so long a Cinderella at the ball? Who in Parliament is to rise and honour the young men who have so courageously vindicated the faith held by a handful of Naval and R.A.F. officers through the lean years?

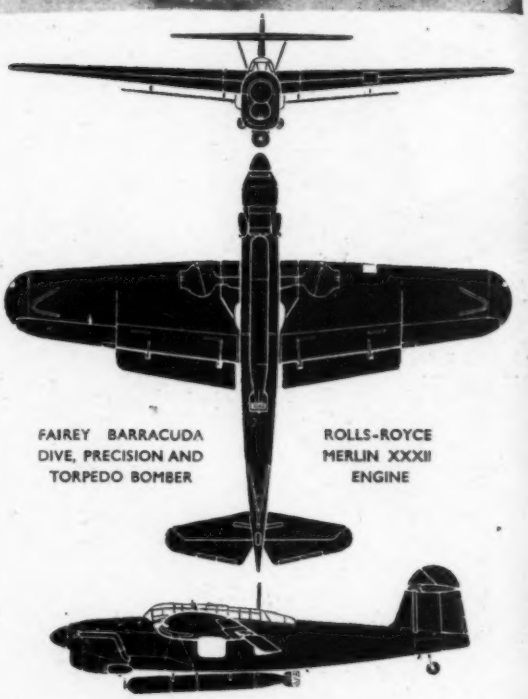
It would be satisfactory if those in Parliament who have been, on the basis of hearsay, so sharply critical or who, for political ends, have thoughtlessly sullied a reputation, were to make an *amende honorable* by a public statement at the first opportunity.

The Barracuda has had a chequered history. Scorning uninformed opinion which arose from ignorance of the sea (for few of The Island Race know at first hand anything about the sea), two classes of aeronautically informed criticism arose. The first comprised those who, knowing the limitations of deck operation, found difficulty in accepting a large single-engined monoplane for deck work carrying a heavy striking load. The doubts and objections of these experienced critics were dispelled when, more than a year ago, Lt. Cdr. Torrens-Spence, D.S.O., D.S.C., R.N., made the first deck landings with the Barracuda. These were, in the view of all spectators, "a honey."

What the Critics Forgot

The second class of critics regarded the inevitable etceteras to naval aircraft as an infuriated bull eyes the matador's cloak. They charged madly at the aeronautical aspect—seeing aerodynamic objections which proved the Barracuda was no Spitfire. In so doing they failed to use the essential yardstick of judgment of a warplane—namely, whether it is any use in war. It was to prove this major point that the Barracuda has had to wait so long, for the simple reason that the enemy (more canny than our home critics) showed a continued reluctance to hazard his units against Barracuda attack and thus alone was the coveted

Despite the multitudinous virtues expected of the Barracuda, the finished aircraft is still reasonably clean when everything is tucked up.



FAIREY BARRACUDA DIVE, PRECISION AND TORPEDO BOMBER

ROLLS-ROYCE MERLIN XXXII ENGINE

THE FAIREY BARRACUDA

prize of achievement in air action denied the Barracuda.

The Barracuda perforce had to remain an ace up the Admiralty's sleeve for long months. In industry and in the Services, the delay had a curious vicious-circle effect. In industry the Barracuda came to be regarded as a Never-Never machine. It was delayed in 1940 by having other types jumped ahead in the materials priority and labour priority lists. It became as ill-starred as certain R.A.F. types for which, however, a smoke screen could be spread by talking of other aircraft, whereas the Admiralty—in a praiseworthy economy of effort—had only the one "white hope" which could not be cloaked.

To counter adverse propaganda, some of it unquestionably of enemy origin, the workers on Barracuda were asked to maintain faith. At the instigation of the Chief Naval Representative in the Ministry of Aircraft Production pilots, observers and informed commentators with operational experience of the Fleet Air Arm visited key factories. Many of them confidently foretold the success the Barracuda would have. Their words had a snowball effect. Gradually opinion veered. The Italian fleet was ripe for a smashing attack and the idea filtered through industry that one day

When "landing-on" the Youngman type flaps are lowered to their fullest extent and act more or less in the manner of ordinary split flaps. The ship is H.M.S. *Ravager*, one of the escort carriers. It speaks well for the design that, in spite of its size and weight, the Barracuda can operate from a small deck.

THE FAIREY BARRACUDA

another Taranto would be on record, this time with the Barracuda.

These hopes were dashed when the Italian fleet struck its flag ingloriously. This tame victory for British arms set back the Barracuda once again, and when, months later, the *Scharnhorst* slipped out under cover of arctic dark and was eventually cornered by large numbers of warships, the opponents of sea-air power were again cock-a-hoop.

The Long-awaited Opportunity

At long last opportunity came, and the strike was as successful as its planning was bold. The faith of workers and those who have long preached this gospel has been vindicated. They may apply themselves with new vigour and resolution to production, since it can be a safe bet that unless the Japs follow the ignominious surrender of their Italian allies they, too, will feel the sting of the Barracuda.

Whilst industry was puzzled and perturbed—for nobody liked to be building something which was not taking such a conspicuous part in the war as, for example, the Halifax and Lancaster—in the Service itself an odd situation arose. The great majority of the pilots were biplane pilots; some had, in this war, by 1942 clocked up more than 1,000 hours on Swordfish and Albacore. These experienced pilots did not relish going back to *ab initio* stage to learn to fly monoplanes with their entirely different characteristics and, in the result, the affection for the old type, so vice-free and long-suffering with those who flew badly, caused adverse comment on what came to be known as "The Mighty Metal Monster."

These hardy stalwarts had to be groomed to a new flying technique. They had to learn that such a thing as a high-speed stall existed, despite the ridicule of some of their seniors who denied there was any such thing. They took to the new aircraft gingerly, suspiciously, until one day a well-known test pilot slow-rolled a Barracuda just above the hangar tops of a certain fighter station. (This caused a marvellous comment from the non-flying Commander: "If you must do slow rolls, please do them in a seamanlike manner!")

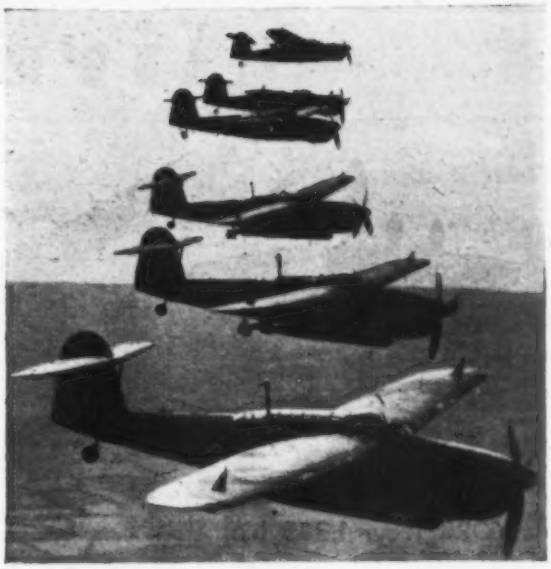
One of the problems which confronted the designers in their efforts to meet operational tactical requirements was to provide a monoplane which would not build up excessive speed in the dive. There were two points to this: if the speed were excessive the torpedo would strike the water too hard and if it did not thus break its back it would certainly run inaccurately. Secondly, having released the torpedo at close range, a sharp turn-away was required to avoid enemy gunners; with excessive speed this would cause a black-out or a flick stall. To give lower speeds in a steep dive, the Barracuda has two special flaps which give the necessary retard action. Incidentally, the flaps assist deck flying.

Looking Ahead

Another aspect of the Barracuda is forward vision. This, again, is necessary for sure attack by torpedo or dive-bomb and also for deck flying. The outlook from the cockpit is remarkably good.

Wing-folding provided another headache. Can it be stated now, once for all time, that wing-folding is not solely a matter of size of the lift in a carrier? Obviously folded wings allow more aircraft to be accommodated per ship (or per hangar), with the result that the striking power of the carrier as a unit is increased in direct proportion as the folding wings save hangar space.

As can be seen from inspection of the photographs, the high-wing design places the wings far above reach of any deck-handling party. Thus, whereas the deck hands can with much zest hurl themselves on to a Swordfish lower wing and grapple it, the Fairey engineers had to think up a new device to meet handling problems. The answer has been a complete success.



An echelon of six Fairey Barracudas operating in the role of torpedo-bombers. The pilot sits in line with the leading-edge and his view is excellent in all directions except downward and backward. This blind spot is looked after by the crew.

An interesting point about the Barracuda is that it is equipped with spools for catapult launching. The implications of this are many, but, fully loaded, it must be one of the heaviest aircraft ever catapulted into the air—again an aeronautical engineering success.

One thing is also outstanding. The Barracuda is the first wartime operational aircraft designed, built and flown especially for the Fleet Air Arm. It is not a conversion job, excellent though such conversions as Seafire from Spitfire may be. It may well mark the new era of the naval air service which has been a ready and willing learner of the lessons of war. It may well be the forerunner of other surprises up the Admiralty sleeve.

Some Noteworthy Points

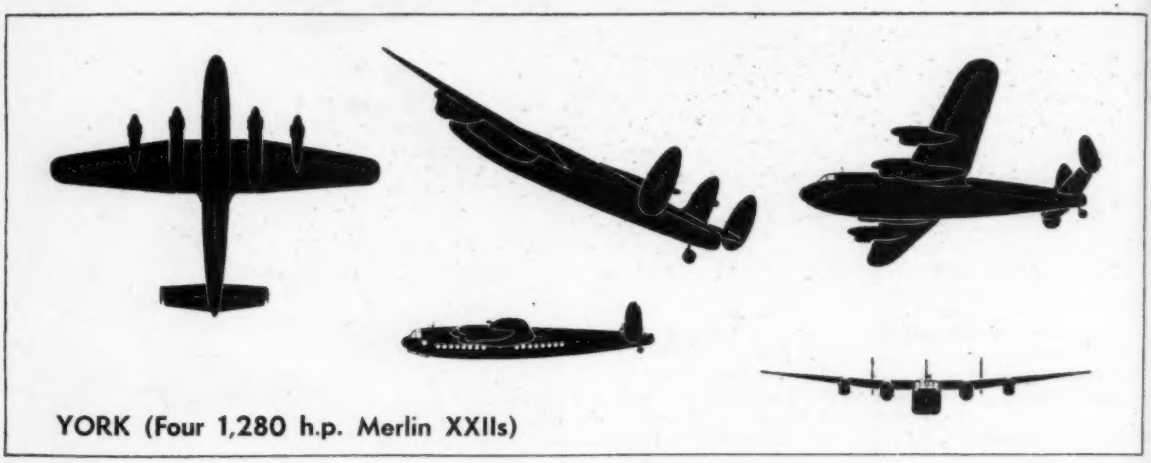
In above article Mr. Hurren has outlined some of the design difficulties which had to be overcome. Few detailed particulars have been released, but the following points are noteworthy. It is probably not too much to say that the Youngman flap has made the Barracuda possible. Located below the wing, and capable of a wide range of angular settings, this type of flap gives extra lift for the take-off, still greater lift for landing, and when set at a negative angle forms a very effective diving brake, as one of the photographs shows.

The high wing position, introduced for reasons given above, brought with it some thorny undercarriage problems. The height of the undercarriage was considerable, and the folding became something of a problem. However, the difficulties were overcome by the joint efforts of the Fairey and Lockheed engineers, and when the wheels are stowed there are no drag-producing excrescences.

That the Barracuda is a heavy aircraft is obvious from the fact that it carries a crew of three (pilot, observer and wireless operator/air gunner), plus the weight of a torpedo, bombs or mines. Thus all the power that could possibly be made available was needed. As usual, Rolls-Royce, Ltd., came to the rescue—with their Merlin 32. Generally similar to other Merlin models, the 32 has a low supercharger gear drive ratio (8.588:1) which gives extra power at sea level and a good initial rate of climb, although power is obviously not maintained up to such great altitudes as is the case with faster-running blowers. That, however, is not a serious drawback in Fleet Air Arm aircraft. For take-off the Merlin 32 gives nearly double the power that was available in the Merlins fitted in Hurricanes and Spitfires at the beginning of the war. Certain engine parts have been strengthened to cope with the extra power, but the engine weight has not increased materially, and, of course, the frontal area is unchanged.

Studies in Recognition

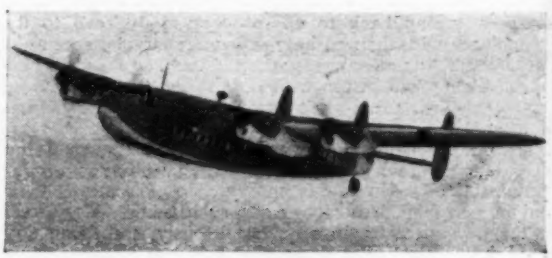
Aircraft in F



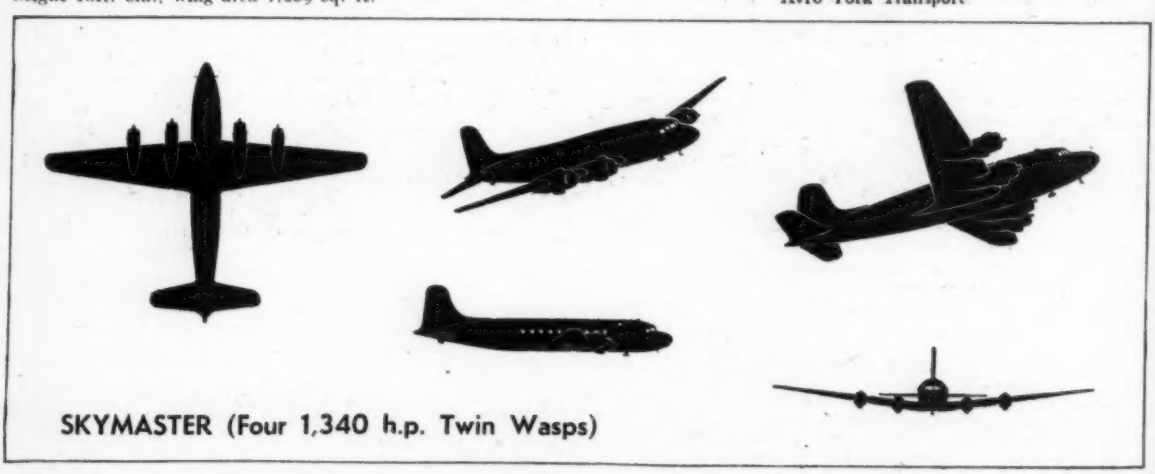
YORK (Four 1,280 h.p. Merlin XXIIs)

ALTHOUGH certain American journals have referred to the Avro York by such terms as "makeshift" and "flying box-car," they probably had no intention of belittling what is an extremely useful aircraft. The terms used no doubt referred to its being in the nature of a wartime interim design of excellent load-carrying capabilities. It is powered by four 1,280 h.p. Rolls-Royce Merlin XXII engines and can accommodate more than fifty passengers or a mixed load of passengers and freight. A York recently flew from Britain to New Delhi in just over 42 hours, including stops *en route*.

Recognition points include Lancaster wing and power-unit components in the high-wing position, and Lancaster tail assembly plus a central fin; streamlined square-section fuselage with long nose. Dimensions: Span 102ft., length 78ft. 6in., height 16ft. 6in., wing area 1,209 sq. ft.



Avro York Transport



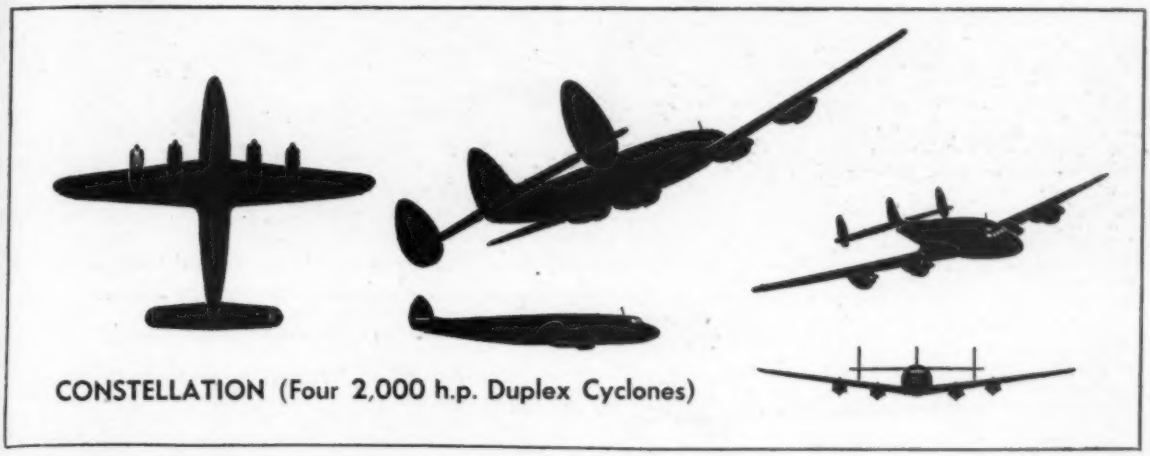
SKYMASTER (Four 1,340 h.p. Twin Wasps)

Douglas Skymaster C-54 Transport.

A MILITARY conversion of the Douglas DC-4 civil airliner, the Skymaster (C-54) has a top speed of about 255 m.p.h. The 1,340 h.p. Pratt and Whitney Twin Wasp is normally fitted, but some models have four 1,000 h.p. nine-cylinder Wright Cyclones, in which case the performance is reduced. A notable feature of the C-54 is its tricycle undercarriage, giving the advantage of a level floor for loading and unloading, though being a low-wing type, it is rather high.

Wings are of high aspect-ratio, symmetrically tapered to almost pointed tips; the tailplane has less taper and rounded tips. Single fin and rudder are large, with a straight, almost vertical trailing edge and spinal fillet. Circular sectioned fuselage is well streamlined but roomy. Dimensions: Span 117ft. 6in., length 93ft. 10in., height 27ft. 10in., wing area 1,462 sq. ft.

Flying Attitudes



CONSTELLATION (Four 2,000 h.p. Duplex Cyclones)

Lockheed Constellation C-69 Transport.

ORIGINALLY conceived as a civil airliner, the Lockheed Constellation is now in production as the C-69 transport. It is powered by four 2,000 h.p. 12-cylinder Wright Duplex Cyclones and has a top speed of over 300 m.p.h. A feature of its design is the aerofoil longitudinal camber of the fuselage which is circular in cross-section. A tricycle undercarriage with twin wheels is employed. It can accommodate sixty troops and their equipment in a pressure cabin permitting operation at 30,000ft.

Recognition points include high aspect-ratio low-wing tapering mostly on leading edge to small tips; wide, slightly tapered tailplane with round tips projecting beyond egg-shaped twin fins and rudders; fixed central fin; engines underslung. Dimensions: Span 123ft., length 94ft. 11in., height 18ft. 8in., wing area 1,744 sq. ft.

ME 323 (Six 950 h.p. Gnome-Rhones)

OFTEN paradoxically referred to as a "powered glider," the Messerschmitt Me 323 transport was developed from the Me 321 transport glider, chiefly by attaching six French-built 950 h.p. Gnome-Rhone radial engines to the wide flat centre-section of its strut-braced high wing; doubtless some structural strengthening was also necessary. Top speed is only about 150 m.p.h., and its maximum carrying capacity is 130 armed troops or 26,000 lb. in freight with a range of about 700 miles. The nose of the slab-sided fuselage is split vertically and opens to admit such items as small motor lorries and 88 mm. *Flak* guns.

Wings and tailplane are of high aspect-ratio and taper to small square tips; single fin and rudder, the former being strut-braced above and below; ten-wheeled undercarriage with long "mudguard" fairings. Dimensions: Span 181ft., length 93ft. 6in., height 24ft., wing area 2,700 sq. ft.

Messerschmitt Me 323 Transport.

HERE AND THERE

Canadian A.V-M. Dies

AIR VICE-MARSHAL W. R. KENNY, D.F.C., the Canadian Air Attache at Washington, has died at Ottawa. He was 58 and was appointed four years ago.

Aid to Russia

IT may come as a surprise to many people to learn that up to October last, Great Britain had sent 4,690 aircraft to Russia, and these included a considerable number of Spitfire V fighters, complete with spare engines and other parts.

Outstanding

COL. ISAAC W. OTT, commanding the base air depot area, Air Service Command, U.S. Strategic Air Forces in Europe, has been promoted to Brigadier-General.

Last month General Ott was awarded the Legion of Merit for outstanding service as commanding officer of one of the largest and most important base air depots in England.

Island Airfield

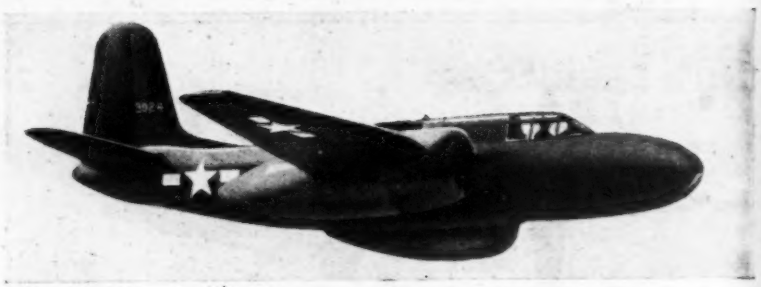
THE Portuguese Government has decided to establish airfields on the Portuguese Island of St. Thomas and Prince's Island off West Africa, according to the German Overseas Radio recently quoted by Reuter.

R.Ae.S. Lecture

A TALK on "Power-plant Installation and Design" is to be given by Mr. A. J. Churchill to the Graduate and Student Section of the Royal Aeronautical Society on Thursday, May 11th. The meeting will be at 7.30 p.m. in the Society's library at 4, Hamilton Place, London, W.1.

Not Really?

COMMENTING upon the expected visit of Russian officials in Washington to open talks on international civil aviation, *Aviation Daily* says that "American officials regard the impending visit of the Soviet delegation as an indication of Russia's interest in international aviation matters."



CRY HAVOC——!: The streamlined excrescence beneath this Douglas Havoc of the U.S.A.A.F. contains secret special equipment and is not a fuel tank. It has a destructor cartridge for use should the aircraft fall into enemy hands.

We believe it was *Punch* which first coined the phrase, "A blinding glimpse of the obvious."

C.-in-C. Message

AIR CHIEF MARSHAL SIR ARTHUR HARRIS, Commander-in-Chief of Bomber Command, has sent the following message to all the crews under his command:

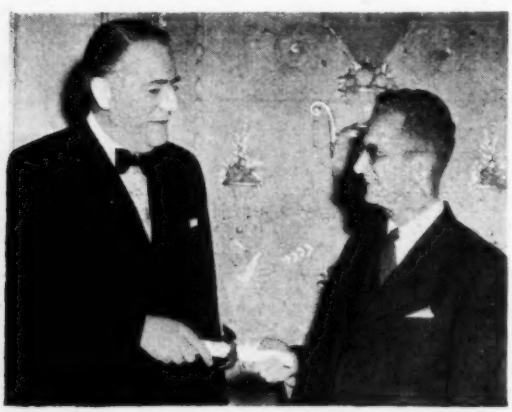
> "Please convey to all operational squadrons my congratulations on the outstanding achievements in March. They may well be proud of the tremendous blows which they have dealt the enemy during this vital period.
>
> "All previous records for sorties and bomb tonnages on objectives in Germany, as on targets as a whole, were far surpassed. This was achieved in spite of difficult weather conditions, and in the face of the bitterest opposition, at the lowest casualty rate for the past thirteen months!"

Tut! Tut!

QANTAS Empire Airways news leaflet for February devotes one of its four pages to an article on jet propulsion, but we are amazed and shocked to see that it falls into the too common error of describing the jet as "the power which presses on the air behind the aeroplane and pushes it forward."

And yet, commenting on the necessity not to confuse jet propulsion with rocket propulsion, it points out, in almost the next sentence, that the rocket will be more efficient in a vacuum where there is no air to offer resistance!

Well, well!



Mr. T. P. Wright presented the certificate to Sir Richard Fairey in New York when the Institute of Aeronautical Sciences conferred an Honorary Fellowship on him.

Prolific America

THE news that America had beaten all her own production records by turning out 9,118 aircraft during March was followed by a statement from Mr. James Forrestal, Under-Secretary to the U.S. Navy, that they plan to build more combat aircraft for their Fleet during the present year than have been built for it during all the previous five years, and it was clear from his remarks that the main object behind this swift and tremendous expansion of U.S. naval air strength was to build up the power to preserve future peace in co-operation with the rest of the United Nations.

Bristols Help A.T.C.

WHEN the Bristol Aeroplane Co. established a showroom in Piccadilly recently it was announced as part of the policy that this should be available to bodies with aeronautical interests. The first to make use of this offer was No. 382 (Westminster) Squadron, A.T.C., which has started a recruiting drive. Headquarters of this squadron are at 21, Arlington Street, a few yards away from the Bristol showroom, and the drive was launched last Friday with a cocktail party given jointly by the squadron and the Bristol company.

No. 382 Squadron is uncommonly well equipped, with classrooms for signals and communications, navigation, aircraft identification, and many other items, including some component parts of Bristol aircraft engines. Lads who decide to join this squadron can be sure of very thorough training.

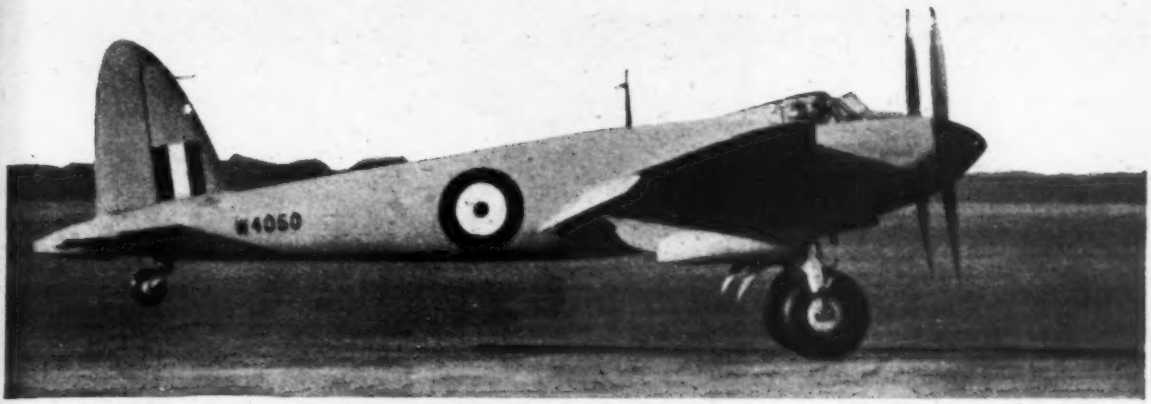
Average Bomb-loads

MARCH figures for R.A.F. and U.S.A.A.F. bombing activities, besides showing the terrific hammering bestowed upon the enemy in Europe by this smoothly working day-and-night co-operation, discloses an interesting comparison in the relative tonnage per sortie delivered.

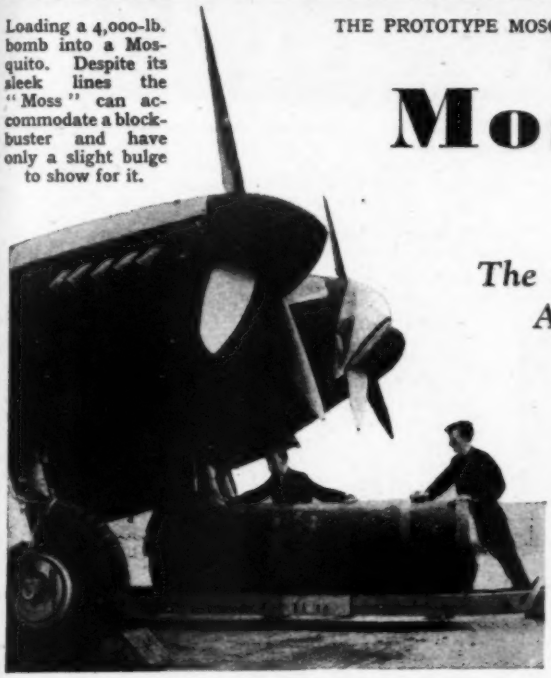
In a total of 12,500 sorties, U.S. heavy bombers dropped 30,172 U.S. tons of bombs, which is approximately 27,430 British tons. This means an average bomb load of 2.19 tons per heavy bomber.

Bomber Command made 8,000 sorties and dropped 28,000 tons, which is an average bomb-load of exactly 3.5 tons per aircraft.

To those who are tempted to think this is rather a low figure, seeing that the maximum bomb-load of a British "heavy" is about eight tons, it must be pointed out that it was shared between the four-engined "heavies" and the Mosquitos.



THE PROTOTYPE MOSQUITO TAKING OFF : This photograph shows clearly the short engine nacelles and undivided flaps.



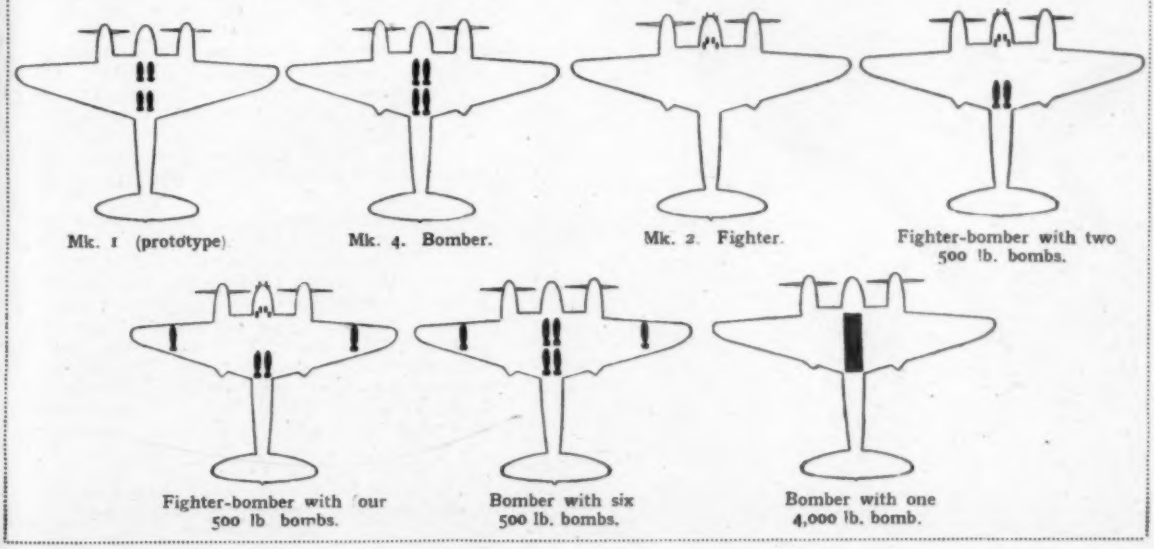
Loading a 4,000-lb. bomb into a Mosquito. Despite its sleek lines the "Moss" can accommodate a block-buster and have only a slight bulge to show for it.

Mosquito Genetics

The Story Behind the Evolution of an Amazing Aircraft Type : Jack-of-all-Trades which is Master of All

MANY years ago, when the aircraft industry was passing through a period of depression, when orders were counted by dozens or even half-dozens, and when the Air Estimates cut the Royal Air Force to the bone, it became necessary to economise in every possible direction. One result was the class of aircraft known as a General Purpose type. It had to perform many duties, and in many respects it had to be very much of a compromise. It came to be accepted that such a type could not be expected to be outstanding in any one direction, and the class ultimately had to give way to more specialised types.

How dangerous can be generalisations on any aviation subject is illustrated by the evolution of the De Havilland



Mk. 1 (prototype)

Mk. 4. Bomber.

Mk. 2. Fighter.

Fighter-bomber with two 500 lb. bombs.

Fighter-bomber with four 500 lb bombs.

Bomber with six 500 lb. bombs.

Bomber with one 4,000 lb. bomb.

MOSQUITO GENETICS

Mosquito. The amazing thing about it is that, contrary to the old saw about "Jack-of-all-trades and master of none," the Mosquito is a top liner in all its variations. How this has come about is told in the following account of the inception and development of the Mosquito.

To appreciate what was involved it is necessary to recall that in the years between the wars the De Havilland Aircraft Co., Ltd., produced no military aircraft types, at least none which became operational. The firm specialised on civil aircraft, of which a vast number of types was built. But when the European atmosphere began to become tense, Captain (now Sir Geoffrey) de Havilland, Mr. C. C. Walker and other D.H. directors could not be expected to refrain from speculating on ways and means of helping the nation should war come. It was agreed that a small fast bomber in which defensive armament was sacrificed in order to get speed would probably be the most useful type. Captain de Havilland felt that two Rolls-Royce Merlins should be used, and that the crew should not exceed two.

AFTER THE FIRST FLIGHT : Geoffrey de Havilland, Junr. (on right with knee pad), who took the first Mosquito into the air on November 25th, 1940, discusses his experiences after landing. He is talking to Mr. A. S. Butler (Chairman of the company), Mr. C. C. Walker and Mr. F. T. Hearle.

In view of the long experience which the firm had had with wood construction of civil aircraft, some of very advanced form, it was natural that this material should come into consideration. The firm's workers were used to wood and had wood-working equipment, the metal industries would be heavily taxed if war broke out; and last, but not least, something like a whole year might be saved in building, testing and developing the prototype.

Then came Germany's invasion of Poland, and the proposal to start work on the design of a twin-engined two-seater bomber was put up to the Air Ministry, where it was well received, particularly by Sir Wilfrid Freeman. After discussions concerning the advisability of including a third member in the crew and fitting some rear armament, the formula which had appealed instinctively from the beginning was adopted. The basic requirement was for a bomb load of 1,000 lb., a range of 1,500 miles, and the performance of a fighter. There were no hampering detailed specifications.

Foreseeing the Fighter

At a conference held on December 29th, 1939, at which these figures were agreed to, the De Havilland representatives stressed the fact that the same formula would produce a very useful long-range fighter. At that time, however, there was little interest in such a class, but the firm kept it in mind and made sure in the design stage that there would be room for four cannon under the pilot's floor. A photographic reconnaissance version was also discussed, and the Air Ministry showed some interest in this.

On March 1st, 1940, the De Havilland company was given a contract for 50 Mosquito bombers. It was not thought wise to place a larger order because there might be developments, and alternative types might be needed. At the time of Dunkirk, home defence became the immediate concern, and actually the Mosquito was omitted from one M.A.P. programme after Dunkirk. This held up permission to buy materials, but the company pressed for, and ultimately obtained permission to proceed, provided work did not interfere

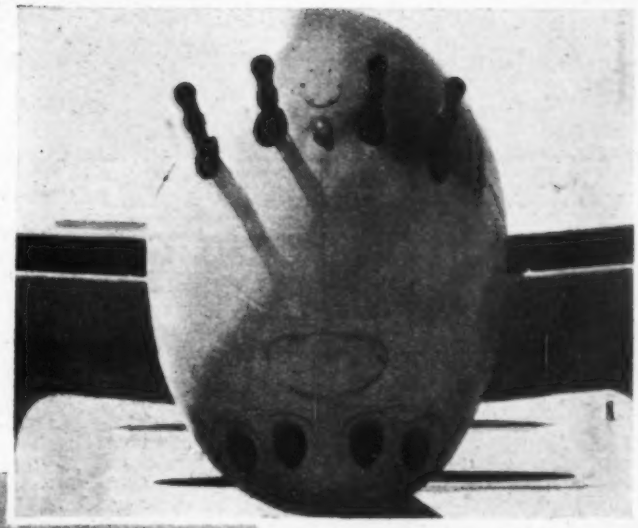
The Mosquito Mk. IV reconnaissance bomber with the flame damping exhaust shrouds used for night flying.

In 1942 the Mosquito Mk. II night fighter was clothed in all-black paint.

with the production of Oxfords and Tiger Moths. It was largely as a result of Lord Beaverbrook's realisation of the fact that the Mosquito would not cut into demands on the metal industries that permission was given to carry on with the work.

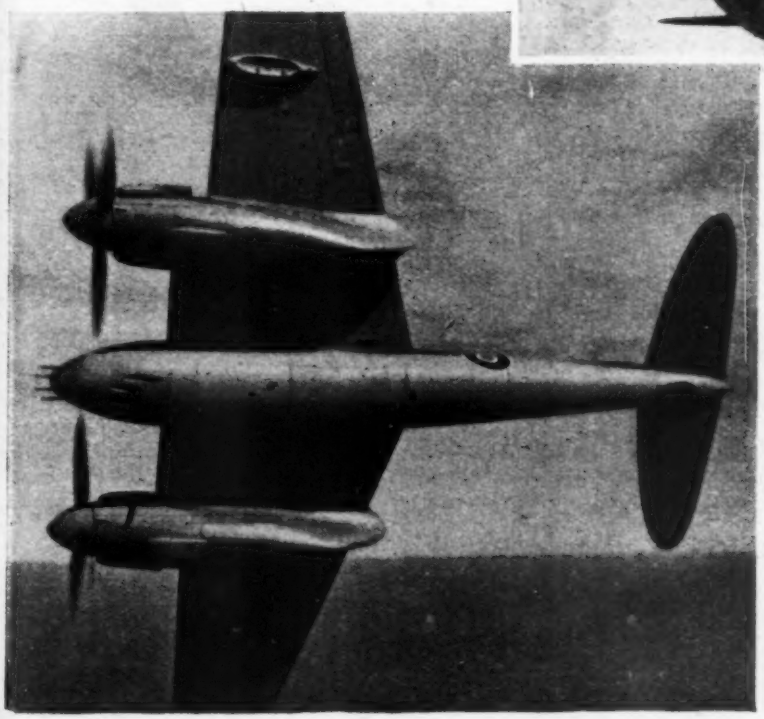
By July, 1940, there was uneasiness about the idea of an unarmed bomber, but some interest in a long-range fighter, and the original programme was changed to 20 bombers and 30 fighters. This meant delay since spars had to be strengthened for the higher fighter factors, and 28 fuselage noses already finished had to be altered for the fighter version.

The prototype, painted a very prominent yellow, made its first flight on November 25th, 1940, piloted by Geoffrey de Havilland, Junior. This flight took place four days short of 11 months after beginning the design work, an achievement which has never been sufficiently appreciated. Manufacturers' trials were completed in three months, and the prototype was then handed over for official trials on February 19th, 1941. Modifications were few, the most troublesome being the extension of the engine nacelles aft, which involved splitting the wing flaps.

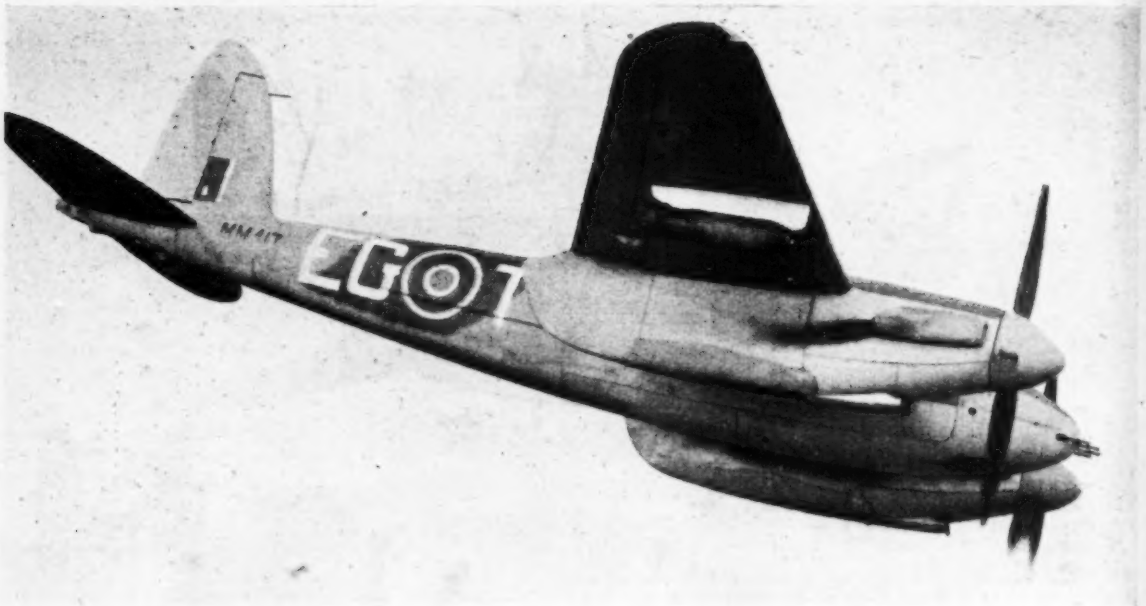


Four 20 mm. cannon and four .303in. machine guns comprise the formidable armament of the Mark II fighter

Interest in the fighter version increased during the winter of 1941, and the fighter prototype made its first flight on May 15th. It had been built in a small dispersal factory, and to avoid the delay of transporting it to the



In the latest fighter-bomber version of the Mosquito the offensive armament is astounding for an aircraft of its size and performance. It carries two 500-lb. bombs in the fuselage and a further two under the wings in addition to the full cannon and machine gun equipment of the fighter.



A STUDY IN SLEEKNESS : A bomb-carrying Mosquito on a daylight sortie.

MOSQUITO GENETICS

home airfield young Geoffrey de Havilland flew it from a sloping field of only 450 yards in length.

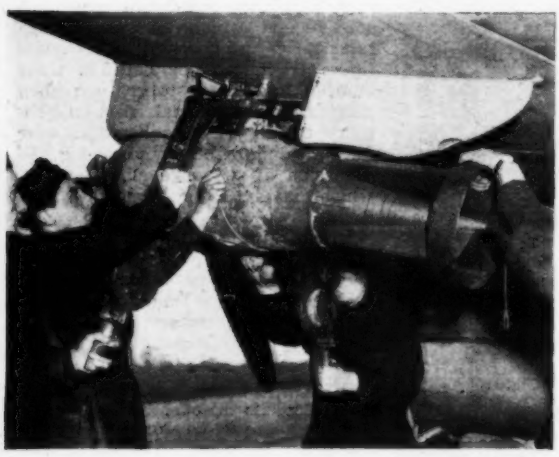
First deliveries to the R.A.F. of Mosquito bombers was made in July, 1941, 19 months after beginning the design, and in the same month the company was given instruction to build in quantities, partly in Canada if practicable,

The First Operational Flight

September 19th, 1941, is something of a red-letter day in the Mosquito calendar, for on that day the first operational flight was made. It was a photographic mission at some 20,000ft. and made at a speed which made fighter interception almost impossible. From then onwards long-range P.R. Mosquitoes kept the whole war area, from this country to Russia in the East, the Norwegian fiords in the North, and the Mediterranean in the South, under photographic surveillance.

Mosquito bomber and fighter squadrons were formed during the winter of 1941-42. Both became operational in May of 1942. After the first 1,000-bomber raid on Cologne (May 31st), Mosquitoes went in and attacked from roof-top height, dropping 500-lb. bombs fitted with 11-second fuses. The first official mention was of the attack on the Gestapo headquarters at Oslo on September 26th, 1942.

Reference has been made to the fact that the original Mosquito programme called for a bomb load of 1,000 lb. and a range of 1,500 miles. In the original design pro-



Loading a 500-lb. bomb on to the port wing rack by the aid of "hockey sticks." A fairing covers the gap in the streamlining after the bomb is crutched down.

Dollies with the special short-finned 500-lb. bombs used by Mosquitoes. Fighter-bombers take two of these in the bomb bay and the bomber versions take four in addition to the two on the wing racks.

vision had been made for four 250-lb. bombs. The machine could carry more weight, and De Havilland engineers suggested that if the standard 500-lb. bomb could be fitted with either retractable vanes or merely shortened vanes, four bombs could be accommodated, thus doubling the bomb load. The short-vane bomb proved a success, and the technique of low attack was perfected and employed during the summer of 1942.

Meanwhile Mosquito night fighters came to the aid of the Beaufighters and other types, which had virtually broken the back of the night blitz. An adaptation of the fighter version was then put on intruder work by night and by day, harassing enemy airfields, power stations, transport and shipping.

The next development was the placing of two 500-lb. bombs behind the cannon breeches of the fighter version, turning it into a fighter-bomber. That was only the beginning. Additions followed rapidly. First came the fitting of 50-gallon drop tanks under the wings to extend the range. Then 250-lb. bombs were made interchangeable with the drop tanks, and next 500-lb. bombs were substituted. This meant that, in addition to its four cannon and four machine guns, the fighter Mosquito was carrying 2,000 lb. of bombs, or twice the original bomb load of the unarmed bomber version. The drop tanks, and the 500-lb. wing bombs, were also fitted to the bomber version, which thus could carry up to 3,000 lb. of bombs.

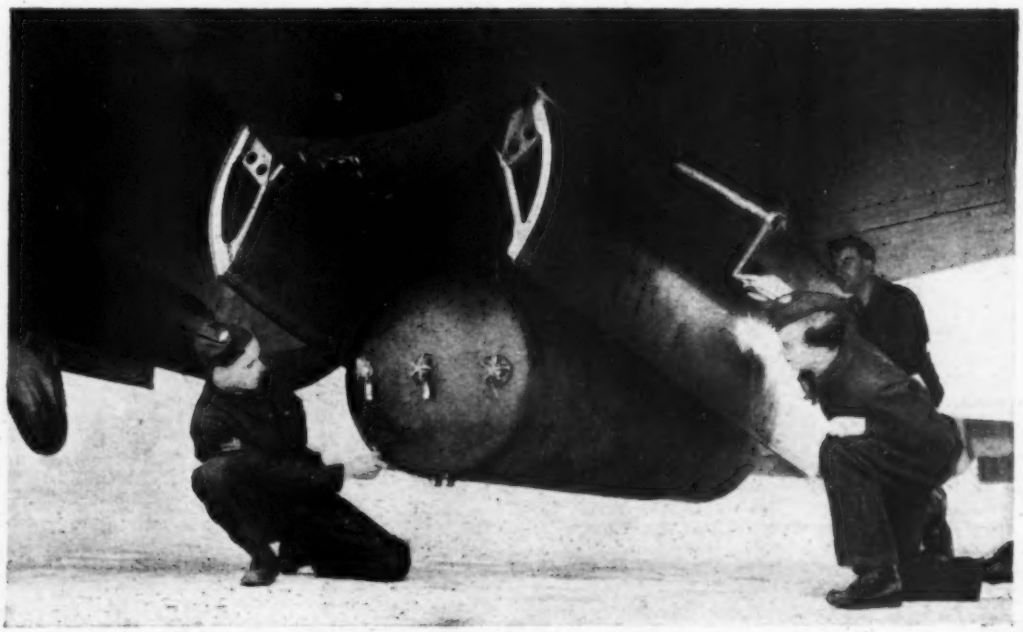
The high-altitude photographic reconnaissance or bomber version. In the bomber the wing tanks can be replaced by bombs while for P.R. work fuel tanks can replace the whole bomb load.

Accommodation for "Block-busters"

Last year, by a slight modification of the bomb bay, De Havilland designers succeeded in accommodating internally a 4,000-lb. "block-buster" bomb. Except for increasing the take-off run, the extra load does not appear to have reduced the performance.

Aircraft design is always a compromise between several conflicting requirements. In this respect De Havilland designers must be given full credit for having chosen exactly the right size of aircraft. The Mosquito owes its outstanding performance partly to its good form and clean design, and partly to its small size. But if it had been smaller its range and destructive powers would have been reduced; if larger, the performance would have suffered.

We began these notes with a reference to the many rôles of the Mosquito. Following is a list of those which have been mentioned up to April: Long-range day fighter (ocean patrol, etc.); night interceptor fighter for home defence; night intruder-fighter and fighter-bomber; day intruder-fighter and fighter-bomber; low-, medium- and high-attack day bomber; low-, medium- and high-attack night bomber; special bomber carrying 4,000-lb. block-buster; path-finder; long-range photographic reconnaissance; and high-speed, long-range transport.



UGLY WORK FOR A BEAUTY. A 4,000-lb. bomb goes up into a Mosquito.

AUSTER IV

Artillery Spotting, Communications and Ambulance Work Among Functions of Latest Taylorcraft : Lycoming Engine Now Fitted

VERSATILITY is the outstanding characteristic of the little Taylorcraft light plane which, from being a popular club machine in the days before the war, has developed into a thoroughly useful military aircraft. Military is the word, since the type has done the majority of its work with and for the Army, although at the time of the landing on the Salerno beaches Austers directed the fire of the Navy, the machines being flown off an aircraft carrier.

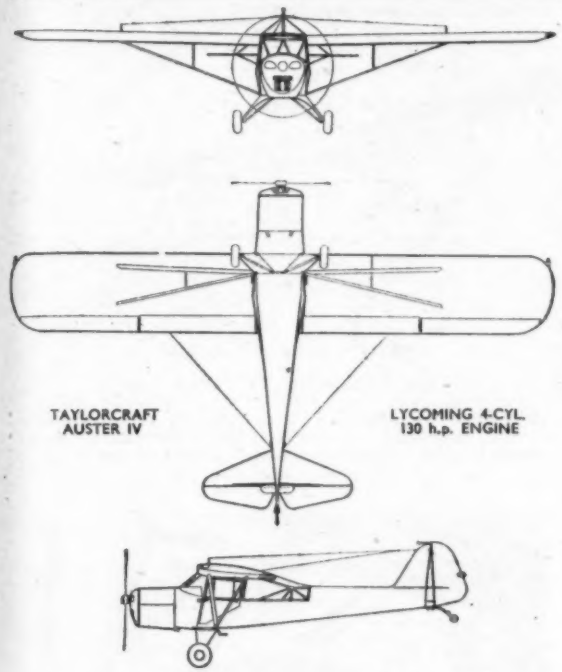
The feature of the Auster which makes it so eminently suitable for work in rough country is its amazingly short take-off (less than 100 yards), steep angle of climb, and the fact that by the use of air brakes and wheel brakes it can get into a tiny field and pull up in almost no distance at all. Coupled with this is the extreme robustness of the structure, which enables it to stand up to very rough handling such as it inevitably receives when operating from small patches of ground that would be quite unusable by more powerful but heavily loaded types. This robustness is due in a large measure to the welded steel tube construction of the fuselage and to the sturdy undercarriage. These features were fully described in the article on the Auster I and Auster III, published in *Flight* of September 23rd, 1943, and it will therefore be sufficient merely to recall them here.

Auster Evolution

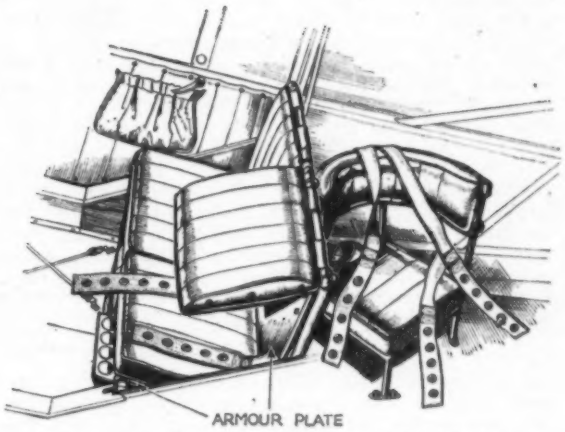
Recent changes in design have added still further to the range of operations of which the Auster is capable. The machine in its latest guise is known as the Auster IV, and is fitted with a 130 h.p. Lycoming flat-four air-cooled engine of 290 cu. in. (4.75 litres) capacity. In this connection it may be recalled that the original Taylorcraft as used by the flying clubs had the smaller Lycoming engine of 55 h.p. Then came the first of the Auster series, the Mark I, which had a 90 h.p. Cirrus engine and a maximum loaded weight of 1,400 lb. The next version was the Auster III, with 130 h.p. Gipsy Major. In this the loaded weight went up to 1,550 lb. In the Lycoming-engined Auster IV the loaded weight has increased to 1,700 lb. In spite of the greater power loading and wing loading, the performance does not appear to have been seriously affected. Even at the maximum permissible weight of 1,700 lb., the take-off run is still under 100 yards. The climb is not quite so good, but with two up it is in the region of 1,000 ft./min. and the climbing angle remains

The Lycoming engine is very accessible in the Auster IV installation. The lower half of the cowling is detached in one piece. The upper hinges upward in two panels.

AUSTER IV



When radio is carried in the Auster IV it is mounted in place of the front starboard seat. Note the armour plating.

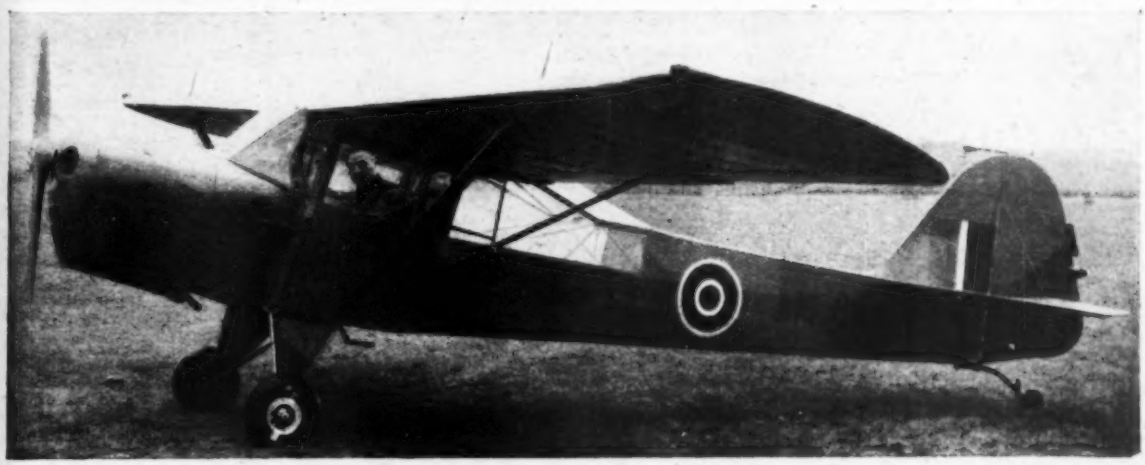


The three-seater Auster IV. The armour-plated back seat pulls forward to give access to the third seat.

good. This is what really matters in an aircraft which has to operate from small fields or short lengths of road, since it enables obstacles to be cleared.

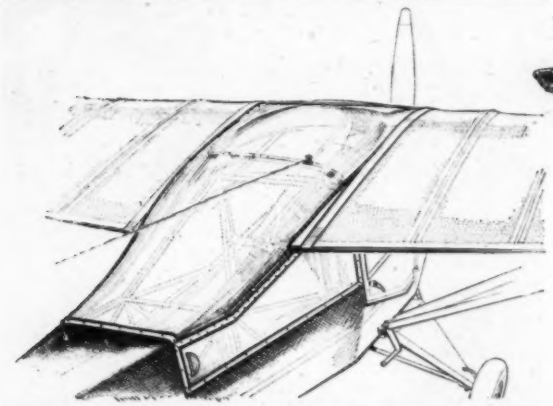
Externally the main difference between the Auster III and the Auster IV is, of course, in the nose. The flat-four engine requires a cowling of totally different shape from that used with the inverted in-line engine. It might be expected that the rounded corners over the front cylinders would obstruct the view somewhat, but this does not appear to be the case. Aerodynamically the cowling itself is of fairly good shape, but the rather large, and nearly flat, area just behind the airscrew may be expected to detract somewhat from its efficiency, since it "blankets" a relatively large proportion of the airscrew diameter.

Next to the nose shape, so far as external alterations are concerned, comes the Perspex cabin roof. This is a very fine moulding, almost entirely free from optical distortion, which still further improves the view upwards and rearwards, already very good in the Auster III. There is considerable truth in the story which Taylorcrafts tell of a delighted passenger who said that flying in the Auster IV

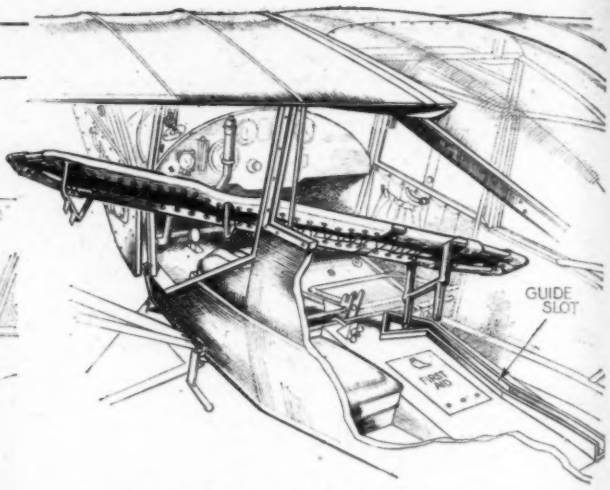


Except for the new engine, the Perspex cabin roof and the tail wheel, the Auster IV resembles previous models externally

AUSTER IV



Upward and rearward view, a special feature of the Auster IV, is afforded by a beautifully moulded Perspex cabin "lid."



The Taylorcraft Auster IV is adapted to accommodate a "stretcher case." This is only made possible by the ingenious guide rail in which one of the legs of the stretcher slides.

was "like sitting in a bubble." The view really is amazingly good.

The third outward change one notices when walking around the Auster IV is that a castering tailwheel has been added to the leaf-spring skid. This addition has still further improved the manœuvrability on the ground, both for use in conjunction with the differential wheel brakes while taxying, and for man-handling the machine while parking, etc.

Internally very considerable changes have been made in the Auster IV. In order still further to increase its range of duties, it is now available with a third seat, located on the starboard side, and the cabin proper has been extended considerably rearwards. The Perspex roof gives ample light, and as there is quite a lot of room around the rear seat, the handling of maps or other large but light articles presents no difficulty.

Interior Accommodation

The Auster IV is available as a single-seater, two-seater or three-seater. One version carries a very complete wireless outfit, located in the space normally occupied by the starboard front seat. Here it can be operated by the pilot, or by the occupant of the rear seat. When used for communications work the radio is not carried, and then two passengers, or even three in an emergency, can be carried.

In order to afford protection for the crew when the machine is used for duties on which it is likely to be fired at, armour plate is fitted below and at the back of the seats. This also serves to guard the radio equipment against damage by fire from below.

By making the Auster IV convertible into an ambulance machine the designers appear to have achieved the impossible. One would have thought that the space which could be made available would be quite inadequate. However, it has been done, and what has made it possible is partly the very large side doors but mainly a very ingenious guide rail into which the leg under the far corner of a stretcher is inserted. This rail guides the end of the stretcher so that it can just be slid along. The operation requires care, of course, but an actual demonstration showed that it occupies but a minute or two.

By fitting a long-range fuel tank (leak-proof) the range of the Auster IV has been increased to somewhere between 250 and 300 miles. At a cruising speed of about 110 m.p.h. the machine will do some 20 miles per gallon.

In addition to its other equipment, the Auster IV is fitted with navigation lights, and in some versions a standard blind-flying panel is carried. For work in the desert there is an air cleaner for the air intake, and at the other extreme a hot-air supply for the carburettor under icing conditions. The cabin is air conditioned, hot or cold air being available, and in addition the sliding side windows, incorporated mainly to enable the pilot to put out his head in really "dirty" weather, give ample ventilation when the machine is used in hot climates.

Some versions of the Auster IV are fitted with the standard blind-flying panel.

Main data of the Auster IV are as follows:—

Length o.a.	22ft.
Wing span	36ft.
Wing area	185 sq. ft.
Wing loading (max.)	9.2 lb./sq. ft.
Power loading	13 lb./h.p
Max. loaded weight	1,700 lb.
Max. permissible speed	144 m.p.h.
Max. level speed	130 m.p.h.
Cruising speed	110 m.p.h.
Take-off run	less than 100 yd.
Initial rate of climb	1,000 ft./min.
Range	250-300 miles

The speed figures quoted above are indicated air speed. The climb figures apply to the machine as a two-seater.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

A.T.C. OFFICERS' DRESS

King's Regulations Prevent Replies

YOUR correspondent, G. D. Everington, whose letter is published in your issue of April 6th, under the heading of "A.T.C. Officers' Dress," is taking unfair advantage of what is presumably his civilian status in order to air his views, and gives no opportunity for reply by those most concerned.

Officers of the Training Branch, R.A.F.V.R., are precluded by King's Regulations from writing to the Press on the subject of Dress Regulations, or any other Service matter.

C. GARRARD.

Too Much Useless Criticism

I WOULD like to protest against the amount of correspondence which has recently appeared in *Flight* criticising the A.T.C.

As an ex-member of that excellent corps I have come into contact with a number of different squadrons, and with regard to Mr. Everington's letter on A.T.C. officers' dress I can say that the only A.T.C. officers I have seen wearing peaked caps are ex-R.A.F. aircrew officers, who I consider should be entitled to wear a peaked cap, whether off or on parade.

With regard to the leakage of information, I am sure that officers in the majority of squadrons only allow cadets to handle official books under supervision. I believe that the main leakage of information comes from the Royal Observer Corps, which has access to a far greater amount of unpublished data, probably from the large number of young men among its ranks.

I hope we will hear a little less useless criticism in future of a corps which has done, and is doing, a grand job in turning out men with a good foundation for the Royal Air Force. And from which a good many men are effectively carrying on the air war over enemy skies.

Ex-A.T.C. and R.A.F.

FLIGHT OF BIRDS

Reflections on Wing Design

I LISTENED to Mr. Geoffrey Smith's recent talk on jet-propelled aircraft on the B.B.C., and thought perhaps a few words from one *entirely* without technical knowledge might interest you. I came out here (Argentina) almost 50 years ago, and about 23 years have been spent on the mountain slopes and ranges of the Andes.

This is a great bird country and I have always been interested in the flight of birds. We have here such birds as the condor and eagle, down to pigmy owls and wrens, and almost all birds show very little fear of man. The mountain air is generally very clear and as this is one of the windiest countries in the world, anyone with any interest in flight and blessed with good eyesight has nature's flight tests going on right at his door.

Modern engines are marvellous, but when one compares body design with nature, well, nature has got you all beaten in wing design. There has been, since the war began, some improvement, but why is the tail used mainly to stick a rudder on and to balance the ship. The wind has no effect whatever on a bird that has to fly in a windy country. We have mountain doves here that are a dream to watch. They have to be fast or the hawks would wipe them out, and in the teeth of a wind clawing down the mountains in waves, the dove will go by like a flash. Condors are not fliers; they glide. They seem to have a standard beat to their wings in very slow time. I think they do this more to relieve the strain on the wings than for any other reason.

There has been a lot of research work on the wings of aircraft, but by all designers the fact that the tail is really a third wing seems to have escaped notice. A bird really skates through the air. The tail of an aircraft must have a tremendous brake effect.

A bird in flight is roughly in the form of a concave disc or quoit. The concave form appears to me the reason why, no matter what force or direction the wind blows, the bird can automatically keep balance. Enclosed study of albatross gives a fairly good idea of a glider, unaffected by gales or squalls.

Your talk on jet-propelled aircraft seemed to suggest that this type of aircraft would be far more affected by poor body design than an aircraft with an airscrew. After all, the first aircraft were really box kites with an airscrew, and the farther the box kite type was left behind the more efficient the aircraft.

PERCY JOSE LIVELY.

MORE MISCONCEPTIONS

Delayed Reflections on Weathercocking

I HAVE just received your issue of August 19th last, in which "Indicator" discusses the phenomenon of "weathercocking." I believe the correct explanation is touched on, but as there is a tendency to dismiss the phenomenon as improbable I should like to quote a clear case which I have experienced while soaring a primary type glider over an escarpment in a gusty wind. Here the weathercocking was so pronounced that it was scarcely necessary to move the controls in order to maintain a straight course along the escarpment; each increase in wind speed (which would not be so obvious to the pilot that he would make any unconscious movement of the rudder) caused the aircraft to turn into wind sufficiently to maintain the straight path of resultant flight.

The explanation does not require an analysis of gust structure or consideration of vertical movements. An increase in wind velocity will give the aircraft flying across wind a skidding motion relative to the air, into wind, and until this motion ceases the predominance of fin-area after of the C.G. will cause the tail to be swung round and the aircraft to turn into wind. The fact that the reverse process is not remarked can be explained by the fact that the onset of a gust is more rapid than its dying down.

Weathercocking must, I submit, occur to some extent to any aircraft flying obliquely to the wind whenever there is a change of wind velocity, which is likely to be more pronounced near the ground. In such a case there *is* an axis round which the aircraft can weathercock—namely, the C.G.

R. E. PEARS.
(Capt., R. Signals, India.)

[This letter, dated October 31st, 1943, has just reached us damaged but still readable; it was stamped "Salvaged Mail."—ED.]

BACKBONE OF THE FLEET

Unfortunate Desire for Compromise

IN reply to Mr. I. M. Leach, who, in a letter entitled "Multi purpose Single-seater" (issue of March 23rd), puts forward a proposal for an all-round compromise aircraft to fulfil the roles of fighter, dive-bomber and torpedo-bomber, I can only state equally irrevocably after four years of operational flying in the Fleet Air Arm that it is in some measure this unfortunate desire for compromise that has been our greatest enemy throughout the war.

He mentions a figure of 85 per cent. efficiency as a fighter for his "Wyvern," which I would prefer to call the "Watfor," save that there is much truth in the prehistoric conception of the "Wyvern." Since modern fighter speeds are in the region of 400 m.p.h., and 85 per cent. of this is only 340 m.p.h. (which is below modern bomber speeds), presumably the air-

CORRESPONDENCE

craft in question would have to be a turret fighter in order to knock down the bombers as they passed.

I can only quote to Mr. Leach the two outstanding examples of the consequences of compromise, namely the Skua, probably one of the finest dive-bombing aircraft ever built, but barred from the top class by the inclusion in the specifications of reconnaissance and air combat requirements which so overloaded the aircraft that it became too slow for the proper execution of its initial function; and then the Fulmar, designed with all the ingenuity and ability of Fairey aviation, but doomed as a fighter from the outset because the specification included a second seat for an observer and additional weight of gear that excluded high performance.

Since, for the last four years, every brain in the country has been devoted to the recognised and essential need for squeezing not only 100 per cent., but 101 per cent., out of each aircraft in its own class, I fear Mr. I. M. Leach has not quite got the right answer. Should he care to go up in combat in his 85 per cent. aircraft I will be delighted to offer him a trip in a rather elderly Fulmar over Focke Wulf 190 country, which would undoubtedly convince him of the error of his ways.

"NAVIATOR."

SORTING OUT THE SNAGS

Ask a Test Pilot

JUDGING from the letter published in *Flight* of March 30, either Mr. Blackburn has had very little experience of modern aircraft, or he has been extraordinarily lucky. If he asks any production, maintenance unit, or acceptance test pilot he will learn that, of aircraft which are handed over as being theoretically serviceable after ground check, 50 per cent. (as a minimum) are snagged for one or more troubles of the type mentioned by "Indicator."

To quote only four examples, an undercarriage which, with its indicators, works perfectly on a ground rig, very often fails under airflow pressure; a directional gyro, picked and tested on the bench, will topple or precess when subjected to bumps or small amount of G; an airscrew may constant-speed on ground run, but may hunt badly in the air; and an r.p.m. indicator, though perfectly steady on the ground, will leap all over the place when subjected to flying vibrations. Furthermore, this sort of trouble can regularly crop up on aircraft which may have been tested and passed a week before, and which have been duly inspected before flight.

I have no doubt that manufacturers would be happy to employ Mr. Blackburn at any figure if he could guarantee even an 80 per cent. freedom from retests for troubles which should, in his opinion, be discovered on the ground.

"TEST PILOT."

ROUND-THE-CLOCK BOMBING

Change Hardly Worth While

IN your issue of March 23rd, R. L. Gladwell has put forward a case for using part of the U.S. Bomber Force on night raids.

Below is a précis of some arguments put forward in "Target: Germany" by the Commanding General, Eighth Bomber Command, "to those who favoured switching the American bombers completely to night operations":

(i) Day bombing permits destruction of small targets that could not be found, seen or hit at night.
(ii) Day bombing is more economical, as a smaller force can destroy a given target.
(iii) Enemy defences are kept on the alert 24 hours a day.
(iv) U.S. crews are not equipped or trained in night bombing technique. Switching them over would involve a long training period at a time when delay is unthinkable.
(v) The number of enemy fighters destroyed by day can hardly fail to have an effect on the morale of Nazi pilots.
(vi) At night the heavy defensive armament of the American "heavies" would be so much more dead weight.

I have no doubt, myself, that greater accuracy can be achieved in daylight bombing, although it is true, as R. L. Gladwell points out, that night precision bombing has been greatly facilitated by the use of target indicators.

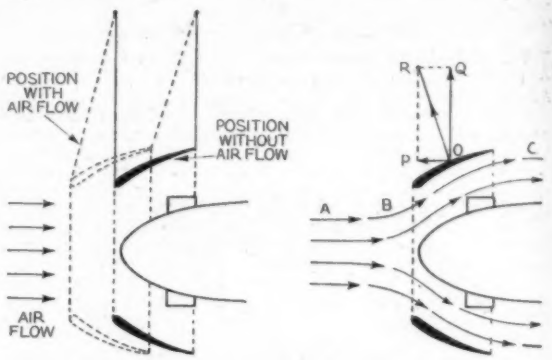
Admittedly, not all the arguments enumerated above are sufficient to condemn a switch of *part* of the U.S. bombing potential to night raids. But providing the weight of the daylight offensive does not grow out of proportion to the night attacks of the R.A.F., the administrative difficulties involved would make even a partial "switch" hardly worth while.

L. W. SAYER, Sgt./A.T.C.

THE DUCTED RADIATOR

Why Negative Drag is Produced

SQN. LDR. BROTHERTON, in his letter printed in *Flight*, April 6th, questions the truth of the statement made by a previous correspondent that the force on a Townend ring is directed forward. Not only have I actually seen this to be the case in a true-to-scale model, but the fact has a perfectly sound theoretical reason. In the model the ring was suspended by threads in its actual position and an air blast turned on. It was seen that the ring really moves forward *against* the air blast.



From theoretical grounds the result can be easily understood. The Townend ring, like the slat of a slotted wing, produces a slot between itself and the engine. In this slot the air flow possesses a direction different from that which it possesses before passing through the ring—i.e., direction changes from AB to BC.

Considering the flow along BC, it is seen that by suitably shaping the ring the total air reaction acting on it will be in the direction OR (just as the air forces acting on the slat in the automatic slot move it out against, apparently, the air flow). By resolving the air reaction represented by OR into two components—one along the line AB and the other perpendicular to it—it is clear that the component OP, instead of being a drag component, is a negative drag component—i.e., is actually helping the ring move forward, and if the latter is loose it will really move. The other component, QO, would be balanced by an equal and opposite component on the diametrically opposite section of the ring, so it does not enter into the question.

It might seem as though we are getting something for nothing (and so violating the Second Law of Thermodynamics), but, of course, we are not. It is merely a case of diverting more of the original energy of the airscrew into forward thrust and less being wasted in creating unwanted turbulence or drag.

R. SHOHAM, B.Sc.

New Edition.

GAS TURBINES AND JET PROPULSION for Aircraft

By G. GEOFFREY SMITH, M.B.E.

A THIRD and enlarged edition of this "FLIGHT" book with illustrated descriptions and comments upon the varying forms of steam and gas turbine-compressor units, is now on the press, and will be available shortly. Fifteen chapters and many new drawings are included. In this latest edition the original chapters have been retained with modifications and additions. The joint official announcement of the R.A.F. and U.S.A.A.F. has made it possible to extend due credit to the inventive genius and pioneer work of British technicians who developed gas turbine units to a practical stage for aircraft. There is a foreword by Sir Geoffrey de Havilland.

Orders for this third edition, which is priced at 6/- or 6/4 by post, will be executed in rotation, and should be addressed to—
Flight Publishing Co. Ltd., Dorset House, Stamford Street, London, S.E.1.

STRANGER IN THE CAMP: An Auster III is flagged off the deck of an aircraft carrier. Behind it is a Fairey Barracuda.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Retirement

GENERAL DUTIES BRANCH.

Air Vice-Marshal (temp. Air Marshal) Sir John T. BABINGTON, K.C.B., C.B.E., D.S.O., is placed on the retired list, and retains the rank of Air Marshal. February 18th, 1944.

Awards

Fleet Air Arm

THE KING has been graciously pleased to approve the following awards for courage and skill in air operations:—

M.B.E. (Mil.)

Act. Temp. Lt. Cdr. (A) J. H. PALMER, R.N.V.R.
Act. Temp. Lt. (A) R. A. SINGLETON, R.N.V.R.
Temp. Sub. Lt. (A) J. Y. C. GALBRAITH, R.N.V.R.

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Second Bar to Distinguished Service Order

Wing Cdr. J. CUNNINGHAM, D.S.O., D.F.C., A.A.F., No. 85 Sqn.—Within a recent period Wing Cdr. Cunningham has destroyed three more hostile aircraft, and his last success on the night of January 2nd, 1944, brings his total to twenty, all, with the exception of one, being obtained at night. He is a magnificent leader, whose exceptional ability and wide knowledge of every aspect of night flying has contributed in a large measure to the high standard of operational efficiency of his squadron, which has destroyed a very large number of enemy aircraft. His iron determination and unswerving devotion to duty have set an example beyond praise.

Distinguished Service Order

Act. Wing Cdr. H. S. L. DUNDAS, D.F.C., A.A.F.—Since the award of the D.F.C. in July, 1941, Wing Cdr. Dundas has led both his wing and smaller formations with marked success. He has destroyed eight enemy aircraft and has displayed great initiative and courage in very arduous circumstances. Under his leadership his wing has achieved outstanding success during the invasions of Sicily and Italy, having destroyed 131 enemy aircraft.

Act. Sqn. Ldr. L. H. BARTLETT, R.A.F.V.R., No. 253 Sqn.—This officer has completed two tours of operational duty. During the campaign in North Africa and later in Italy, the efficiency and fighting spirit of his unit was maintained in spite of continuous day and night operations in extremely adverse weather operating from hazardous and flooded airfields. This was largely due to the cheerful and energetic leadership of Sqn. Ldr. Bartlett. He has invariably displayed the utmost courage and initiative. He has destroyed three enemy aircraft.

Act. Sqn. Ldr. J. A. HEGMAN, D.F.C., R.N.Z.A.F., No. 7 Sqn.—One night in January, 1944, this officer was pilot and captain of one of a force of bombers detailed to attack Berlin. Early on the outward flight some important gear became ineffective. Nevertheless, Sqn. Ldr. Hegman decided to continue his mission and eventually reached the target some ten minutes after the attack was scheduled to end. In spite of the strong defences Sqn. Ldr. Hegman made a successful bombing run and afterwards flew back to an airfield in this country where he effected a safe landing. His efforts on this occasion were typical of the determination and fearlessness he has invariably shown in pressing home his attacks on the enemy. He is a gallant and skilful leader whose sterling qualities have impressed all.

Maj. E. M. BAKER, D.F.C., S.A.A.F., No. 5 (S.A.A.F.) Sqn.—This officer has completed two tours of operational duty. He has served in East Africa, the Western Desert, North-West Africa, Sicily and Italy. Although the majority of his sorties have been against ground targets, Maj. Baker has destroyed three enemy aircraft in air combat and damaged others. During the last five months whilst in command of the squadron he has led practically every sortie destroying and damaging a considerable number of enemy mechanical transport vehicles. Under his leadership the squadron has achieved excellent results.

Bar to Distinguished Flying Cross

P/O. D. R. TOOVEY, D.F.C., R.A.A.F., No. 50 Sqn.—One night in January, 1944, this officer was the pilot of an aircraft detailed to attack Magdeburg. When some fifty miles from the target one of the starboard engines caught fire and became useless. In spite of this P/O. Toovey continued to the target, which he bombed successfully. On the return flight the aircraft gradually lost height and was hit by anti-aircraft fire, sustaining damage to the port flap. Nevertheless P/O. Toovey flew on to base, where he effected a safe landing. This officer has completed a large number of sorties, including six attacks on the German capital, and has invariably displayed a high degree of courage and determination.

Act. Wing Cdr. R. L. BOWES, D.F.C., R.A.F.O., No. 44 Sqn.—Since being awarded the D.F.C. this officer has completed numerous sorties over Germany, including a successful attack on Peenemunde. More recently Wing Cdr. Bowes participated in an attack on Berlin, which he attacked with his usual tenacity, although his aircraft was hit and one engine put out of action. In spite of the damage sustained Wing Cdr. Bowes

Major E. M. Baker, D.F.C., No. 5 S.A.A.F. Squadron, who has been awarded the D.S.O., seated in the cockpit of a Curtiss P-40. The official citation appears on this page.

SERVICE AVIATION

flew the aircraft to a home-based airfield near the coast and effected a safe landing. In addition to his activities in the air, Wing Cdr. Bowes has devoted much energy towards the training of other members of the squadron with excellent results.

Act. Flt. Lt. W. C. T. BRAY, D.F.C., R.A.F.V.R., No. 407 Sqn.—Since being awarded the D.F.C. this officer has bombed such heavily defended German targets as Berlin, Hanover and Bochum. He invariably presses home his attacks with the utmost vigour and skill, and the fine photographs he has secured reflect the accuracy of his bombing. At all times, Flt. Lt. Bray's coolness, courage and devotion to duty have been of the highest order.

Act. Flt. Lt. P. A. COLDHAM, D.F.C., R.A.A.F., No. 156 Sqn.—Flt. Lt. Coldham has always proved himself to be a distinguished pilot and captain of aircraft. He has shown great courage and determination during his tour of duty, which he has extended voluntarily to coincide with that of his crew. He has been, at one time or another, detailed to attack most of the enemy's heavily defended objectives, and in spite of the intense opposition frequently encountered, has never failed to press home his attacks effectively.

Distinguished Flying Cross

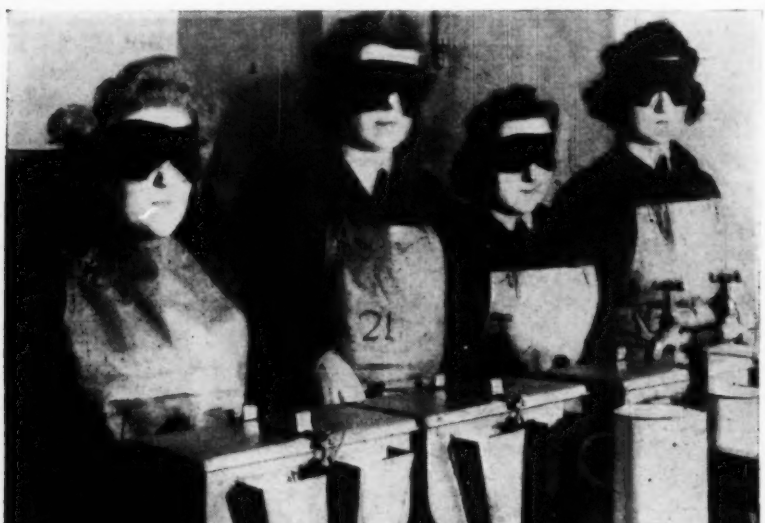
Act. Wing Cdr. R. R. THOMSON, R.A.F.V.R., No. 114 Sqn.
Act. Sqn. Ldr. H. R. HARRISON, R.A.F.V.R., No. 55 Sqn.
Act. Sqn. Ldr. D. F. PERRENS, R.A.F., No. 425 Sqn.
Act. Sqn. Ldr. A. P. WHICHER, R.A.F., No. 114 Sqn.
Flt. Lt. J. F. C. MELROSE, R.A.F.V.R., No. 55 Sqn.
Flt. Lt. V. G. J. PHILLIPS, R.A.F., No. 255 Sqn.
Flt. Lt. E. G. SHEARS, R.A.F.V.R., No. 55 Sqn.
Flt. Lt. H. S. WOODS, R.A.F.V.R., No. 145 Sqn.
Act. Flt. Lt. H. W. CLYNE, R.A.F.V.R., No. 682 Sqn.
Act. Flt. Lt. J. W. RYDER, R.A.F.V.R., No. 223 Sqn.
Act. Flt. Lt. R. D. THIRSK, R.A.F.V.R., No. 104 Sqn.
F/O. J. BERRY, R.A.F.V.R., No. 255 Sqn.
F/O. D. O. HENDRY, R.A.F.V.R., No. 219 Sqn.
F/O. P. R. HUMPHREY-BAKER, R.A.F.V.R., No. 114 Sqn.
F/O. D. S. POLLARD, R.A.F.V.R., No. 255 Sqn.
F/O. C. J. ROGERS, R.A.F.V.R., No. 37 Sqn.
F/O. C. W. C. TURNER, R.A.F.V.R., No. 223 Sqn.
F/O. I. WATSON, R.A.F.V.R., No. 255 Sqn.
P/O. E. J. DENNIS, R.A.F.V.R., No. 104 Sqn.
W/O. W. M. ANDERSON, R.A.F.V.R., No. 18 Sqn.
W/O. G. W. POTTER, R.A.F.V.R., No. 223 Sqn.
Act. Sqn. Ldr. H. S. SMITH, R.A.A.F., No. 683 Sqn.
F/O. A. G. B. BLUMER, R.A.A.F., No. 601 Sqn.
W/O. J. T. BYRNE, R.A.A.F., No. 223 Sqn.
W/O. A. J. MARTIN, R.A.A.F., No. 682 Sqn.
Act. Flt. Lt. R. H. STRINGER, R.C.A.F., No. 223 Sqn.
F/O. W. H. REID, R.C.A.F., No. 43 Sqn.
W/O. A. J. C. MOWER, R.C.A.F., No. 223 Sqn.
W/O. J. F. RACETTE, R.C.A.F., No. 37 Sqn.
F/O. N. A. WARD, R.N.Z.A.F., No. 490 (R.N.Z.A.F.) Sqn.
P/O. S. J. FOURNEAU, R.N.Z.A.F., No. 450 (R.N.Z.A.F.) Sqn.
Maj. A. E. HALSE, S.A.A.F., No. 24 (S.A.A.F.) Sqn.
Flt. Lt. R. F. C. GARVEY, R.A.F., No. 170 Sqn.
F/O. F. M. HENRY, R.A.F., No. 107 Sqn.
F/O. V. WALL, R.A.F., No. 226 Sqn.
Act. Sqn. Ldr. K. R. SANDS, R.A.A.F., No. 450 (R.A.A.F.) Sqn.
Flt. Lt. R. T. HUDSON, R.A.A.F., No. 450 (R.A.A.F.) Sqn.
Flt. Lt. R. C. ROBERTSON, R.A.A.F., No. 450 (R.A.A.F.) Sqn.
Act. Flt. Lt. G. E. LOWE, R.A.F.V.R., No. 10 Sqn.
F/O. D. W. FIELD, R.A.F.V.R., No. 7 Sqn.
F/O. D. C. THOMSON, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
P/O. R. S. YELL, R.A.A.F., No. 12 Sqn.
W/O. E. S. HAWKES, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
W/O. T. P. JUPP, R.A.F.V.R., No. 49 Sqn.
W/O. W. A. MARTIN, R.C.A.F., No. 218 Sqn.
W/O. E. T. MCLEOD, R.C.A.F., No. 50 Sqn.
W/O. J. WOODS, R.A.F., No. 97 Sqn.
Act. Wing Cdr. G. T. WYNNE-POWELL, R.A.A.F., No. 90 Sqn.
Flt. Lt. T. V. CLARKE, R.A.A.F., No. 622 Sqn.
Flt. Lt. C. H. HAWKINS, R.A.F.V.R., No. 21 Sqn.
Flt. Lt. H. R. LEVEN, D.F.M., R.A.F.V.R., No. 487 (N.Z.) Sqn.
Act. Flt. Lt. H. W. BRISTOW, R.A.F.V.R., No. 158 Sqn.
Act. Flt. Lt. G. H. LAING, R.C.A.F., No. 57 Sqn.
Act. Flt. Lt. D. C. WOODRUFF, R.A.F.V.R., No. 15 Sqn.
F/O. W. T. HAXBY, R.A.F.V.R., No. 57 Sqn.
F/O. R. H. KNIGHTS, R.A.F., No. 101 Sqn.
F/O. F. G. D. SMITH, R.A.F.V.R., No. 101 Sqn.
F/O. M. J. NOLAN, D.F.M., R.A.F.V.R., No. 487 (N.Z.) Sqn.
F/O. G. J. WALLACE, R.A.F.V.R., No. 158 Sqn.
Flt. Lt. R. W. A. MACKICHAN, R.A.F.V.R., No. 3 Sqn.
Act. Flt. Lt. R. N. SHARD, D.F.M., R.A.F.V.R., No. 78 Sqn.
F/O. N. A. MARSTON, R.A.F.V.R., No. 78 Sqn.
Act. Sqn. Ldr. G. B. COOKE, R.A.F.V.R.
Act. Sqn. Ldr. G. M. ROBINSON, R.A.F.O., No. 436 (R.A.A.F.) Sqn.
Flt. Lt. A. E. ASHCROFT, R.A.F.V.R., No. 29 Sqn.
Flt. Lt. R. M. CHATFIELD, R.A.F.V.R., No. 267 Sqn.
P/O. P. H. COPE, R.A.F.V.R., No. 15 Sqn.
P/O. L. FALGATE, R.A.F.V.R., No. 76 Sqn.
P/O. J. H. PETRIE-ANDREWS, D.F.M., R.A.F.V.R., No. 35 Sqn.
Act. Sqn. Ldr. W. P. KEMP, R.N.Z.A.F., No. 227 Sqn.
Act. Sqn. Ldr. C. W. SMITH, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
Flt. Lt. A. E. KILSBY, R.A.F.V.R., No. 102 Sqn.
Act. Flt. Lt. S. R. W. LAINE, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
P/O. L. A. MILLER, R.A.F.V.R., No. 15 Sqn.
F/O. W. S. BRECKENRIDGE, R.A.F.V.R., No. 626 Sqn.
P/O. W. B. BAKER, R.A.F.V.R., No. 626 Sqn.

Conspicuous Gallantry Medal (Flying)

Flt. Sgt. G. C. C. SMITH, R.A.A.F., No. 156 Sqn.—This airman was the rear gunner of an aircraft detailed to attack Berlin one night in February, 1944. When nearing the target, Flt. Sgt. Smith reported a fighter coming into attack. As evading action was being taken, the bomber was hit by cannon and machine-gun fire from the enemy aircraft. Flt. Sgt. Smith was hit by a bullet which shattered the lower part of his right leg and foot. The hydraulic gear had been damaged and his turret was rendered unserviceable. Although suffering intensely and in a dazed condition, Flt. Sgt. Smith refused assistance and insisted on remaining at his post to manipulate his turret manually until the enemy coast was crossed. In most distressing circumstances, this gallant airman, whose leg has since been amputated, displayed courage and fortitude of a high order. His determination to defend his aircraft until the enemy coast was crossed set a magnificent example.

Distinguished Flying Medal

Flt. Sgt. J. T. R. BURKE, R.A.F.V.R., No. 70 Sqn.
Flt. Sgt. F. SIMPSON, R.A.F.V.R., No. 685 Sqn.
Sgt. A. CALVERT, R.A.F.V.R., No. 37 Sqn.
Flt. Sgt. G. MARSH, R.A.F.V.R., No. 102 Sqn.
Flt. Sgt. C. RAMSDEN, R.A.F.V.R., No. 76 Sqn.
Sgt. W. M. J. SAVELL, R.A.F.V.R., No. 102 Sqn.
Sgt. W. G. HOLT, R.A.F.V.R., No. 463 (R.A.A.F.) Sqn.
Sgt. J. WHITTER, R.A.F.V.R., No. 76 Sqn.
Flt. Sgt. J. DALTON, R.A.F.V.R., No. 205 Sqn.
Flt. Sgt. W. H. C. COLLINS, R.A.F.V.R., No. 148 Sqn.



KEEPING IT DARK: W.A.A.F. photographers learning how to handle photographic apparatus by touch.

Royal New Zealand Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy in the South Pacific area:—

Distinguished Flying Cross

Flt. Lt. M. T. VANDERPUMP, No. 16 (N.Z.) Sqn.

Distinguished Flying Medal

Flt. Sgt. P. A. TILYARD, No. 16 (N.Z.) Sqn.
Flt. Sgt. E. C. LAURIE, No. 16 (N.Z.) Sqn.

Roll of Honour

Casualty Communiqué No. 373.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 159 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Flt. Sgt. H. A. Booth; Flt. Sgt. A. S. Jefferies.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. L. V. C. Brooker; Sgt. A. D. Bulmer; Sgt. N. J. Calcraft; Flt. Sgt. P. A. Chapman; Flt. Sgt. T. G. Edwards; Act. Sqn. Ldr. D. P. Fox, D.F.C.; Flt. Sgt. A. J. Hebblewhite; Flt. Sgt. A. M. Johnson; Sgt. W. G. Johnson; Flt. Sgt. D. G. C. Jones; Sgt. C. R. Musson; Sgt. P. F. Nixon; Sgt. E. H. Roden; Sgt. R. J. Small; Flt. Sgt. A. S. Spires, D.F.M.; Flt. Sgt. P. F. Stanley; Sgt. A. A. Walrond; Flt. Sgt. T. A. Wood.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. E. E. A. Ambridge; Sgt. F. Anderson; Sgt. H. Anderson; Flt. Sgt. L. J. Austin; Sgt. R. A. C. Avery; Sgt. F. E. Baker; Sgt. L. Bennett; Sgt. W. H. Bestwick; Sgt. G. T. Beveridge; Sgt. D. Birkhead; F/O. R. C. Blythe; Sgt. D. Brooke; F/O. D. F. P. Brown; Sgt. T. Buchan; Sgt. M. C. Burgoine; Sgt. J. Burroughs; Sgt. E. Burton; Sgt. R. J. Chapman; Sgt. J. Clark; Flt. Sgt. J. C. Clark; Sgt. C. F. Coade; Act. Sqn. Ldr. A. A. Cookson; Flt. Sgt. G. M. Crawford; Sgt. J. R. Curtis; Sgt. E. G. David; Sgt. J. A. G. Dawe; Sgt. J. Dodson; Sgt. W. J. Drake; Sgt. F. Dykes; Sgt. A. J. Ede; Sgt. C. Eden; F/O. W. Ellis; P/O. R. Ellison; Sgt. F. W. Farnell; F/O. R. N. Fewtrell; Sgt. S. J. Gaywood; Sgt. H. H. Gentle; Sgt. K. S. Gillard; F/O. J. G. Green; F/O. A. C. M. Griffin; Sgt. M. Harris; Sgt. G. R. Hill; Sgt. F. W. Hope; F/O. C. L. Houedard; F/O. J. M. Hudson; Sgt. W. E. Hughes; Sgt. C. H. Hurle; Sgt. F. J. Jarvis; Sgt. G. G. Jones; Sgt. R. M. Jordan; Sgt. H. Lewis; Flt. Sgt. J. Liddle; Sgt. W. L. Lumsden; F/O. W. C. Luther; Sgt. J. McIlhatton; Sgt. J. R. McLeod; Sgt. A. McQuater; Sgt. D. H. C. MacRae; Sgt. F. Miller; Sgt. F. A. Morris; Sgt. N. S. Mould; Flt. Sgt. J. H. Nuttall; Sgt. W. E. Oliver; Sgt. J. A. Osborn; F/O. R. Paisley; Sgt. G. M. Phillip; Flt. Sgt. J. L. Poulter; Sgt. L. S. Pugh; Flt. Sgt. H. E. Rawlings; Sgt. J. Reffin; P/O. R. S. Rich; Sgt. M. V. Riddle; Act. Sqn. Ldr. S. Robinson, D.F.M.; Sgt. F. C. Rose; Flt. Sgt. W. Scarlett, D.F.M.; Act. Flt. Lt. C. J. Scrivener; Sgt. M. D. Shakespeare; F/O. J. F. Shepherd; Flt. Sgt. R. B. Shepherd; P/O. V. C. Sherring; Sgt. C. H. Sherwood; Sgt. H. Simpson; Sgt. J. Smith; Sgt. M. W. Stone; Sgt. E. T. C. Street; Sgt. A. J. Sutton; P/O. R. A. Timmins; P/O. F. T. Turner; F/O. G. A. Turner; Sgt. G. W. Twitty; Sgt. W. E. Wakeman; Sgt. F. Walton; Sgt. W. H. Waring; Cpl. H. R. Watkinson; Sgt. F. Wheeldon; Sgt. R. Wild; F/O. D. S. Williams; Act. Wing Cdr. E. A. Williamson; Flt. Sgt. J. L. Wilson; P/O. C. B. Wood; F/O. D. R. Woodroffe; Sgt. R. Worrall; Sgt. H. D. Young.

MISSING, BELIEVED KILLED IN ACTION.—F/O. F. I. Allison; L.A/C. C. Davies; W/O. W. Grier;

F/O. R. L. Hawkins; Flt. Sgt. A. S. Jacobs; Sgt. S. C. Linn; Sgt. E. A. Stokes; F/O. P. W. Webb; Sgt. W. H. Westby.

MISSING.—Sgt. W. A. M. Anderson; Sgt. C. R. Bailey; Flt. Sgt. W. H. Boon; P/O. H. D. Broad; Sgt. S. K. Chalklin; Sgt. W. S. Clarke; Sgt. H. S. Conroy; Sgt. R. Cooke; Sgt. D. C. Cornes; Flt. Sgt. G. R. Crawford; Sgt. E. W. D. Downey; Act. Flt. Sgt. R. Gallop; Flt. Sgt. P. Grieve; Sgt. S. J. Harrison; W/O. A. Hazelhurst; Act. W/O. J. K. Ives; W/O. D. W. T. Johnson; Flt. Sgt. G. L. Jones; Flt. Lt. R. H. R. Meyer; Flt. Sgt. C. A. S. Noad; F/O. C. E. Pointon; Sgt. J. S. Pomeroy; Sgt. G. A. J. Prigg; Sgt. P. Rawlings; Flt. Sgt. J. S. L. Reynolds; Sgt. D. P. J. Savage; Sgt. D. Sissons; Sgt. I. E. Smedley; Flt. Sgt. A. W. Squires; F/O. K. G. Thomas; Sgt. G. A. N. Thompson; Sgt. J. Wannop; F/O. J. Wilkinson; W/O. K. F. Wright.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. Allman; F/O. G. E. Beswick; Sgt. H. J. Couling; Sgt. A. J. Denny; Sgt. R. G. Graves; Sgt. J. L. Harrison; A/C.2 S. F. Hurst; Sgt. S. G. Johnson; Sgt. A. C. Jones; Sgt. W. D. Joshua; Flt. Sgt. L. B. Knight; Wing Cdr. G. H. Loughnan; F/O. W. E. Marsh; A/C.2 A. J. Miles; Flt. Sgt. A. Mitchell; Sgt. K. Murray; Flt. Lt. K. W. Noble; Cpl. R. Parry; Sgt. R. H. Ramsey; F/O. E. C. D. Richards; Act. Flt. Lt. P. Riches, D.F.C.; Sgt. J. D. Robertson; Cpl. J. Sharp; Sgt. S. H. Short; L.A/C. R. H. Songhurst; A/C.2 G. J. Smith; F/O. T. W. Townley; Sgt. W. Varley; Flt. Sgt. A. J. Wallis; F/O. G. C. Whitehurst.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Flt. Lt. R. Reavill; A/C.2 G. C. Sheppard.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. G. B. Lamb; Flt. Sgt. S. E. Martin.

DIED ON ACTIVE SERVICE.—W/O. J. Emmins; L.A/C. D. T. Rustage; L.A/C. J. O. Town.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. P. D. Ablett; Sgt. F. E. Bryant; Flt. Sgt. H. W. N. Clausen; F/O. J. P. Phillips; Sgt. D. R. Radford; Sgt. R. A. Woodward; Sgt. H. D. Young.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. L. S. Clayton; Act. Flt. Lt. W. S. E. Dods; Flt. Lt. D. Saunders.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. R. G. Bowley, D.F.C.; W/O. E. D. Chalmers; Flt. Sgt. W. V. Chittock; F/O. V. J. Corless; Act. Flt. Lt. M. K. McKenzie; P/O. N. J. McLeod; P/O. J. R. Ryalls; Sgt. D. E. Somervell.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Lt. K. G. McCallum.

MISSING.—Flt. Sgt. P. Moylan; Flt. Sgt. A. J. Neeson; P/O. F. P. Stanger.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. E. R. H. Murphy.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. W. F. Fitzgerald.

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. A. A. Hadiken.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. F. H. Bowcock; Sgt. C. C. Brook; W/O. F. M. Cole; Flt. Sgt. M. E. Combres; P/O. T. E. Dunlop; Sgt. T. R. N. Fetherston; Flt. Lt. S. R. Fillmore; F/O. H. G. Funkhouser; Sgt. T. A. Ivey; P/O. L. M. Lavallee; Sgt. R. B. MacKenzie; Sgt. G. A. Neville; P/O. J. G. Patteson; Sgt. J. K. Player; Flt. Sgt. C. W. Preston; Sgt. N. Siderchuck; P/O. S. Zareikin.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. S. Einarsson; Flt. Sgt. G. M. O'Neil.

MISSING.—Flt. Lt. J. F. Acer; Sgt. R. E. Allan; W/O. A. R. Armitage; W/O. J. P. R. Boileau; W/O. J. L. A. Champoux; Flt. Sgt. J. A. L. Charest; W/O. J. R. Charlton; W/O. G. Dean; W/O. J. L. Dissing; W/O. J. E. L. Dorval; Sqn. Ldr. M. W. Gibson; F/O. E. S. Guiton; F/O. D. Hackett, D.F.C.; Flt. Sgt. G. E. Hagerman; F/O. E. Hanson; Flt. Sgt. K. Hargreaves; L.A/C. J. W. Husselbee; Sgt. H. Johnson; Flt. Sgt. A. E. Lafferty; W/O. C. J. McCarvill; Flt. Sgt. R. MacGillivray; F/O. A. J. Normandin; Flt. Sgt. C. Phillips; Flt. Lt. W. A. Roberts; W/O. I. F. Ruppel; W/O. J. E. Russell; P/O. A. B. Schultz; P/O. C. E. Simpson; Sgt. J. B. Stewart; Flt. Sgt. R. Urban; Sgt. J. F. Watters; W/O. N. C. E. West.

KILLED ON ACTIVE SERVICE.—Sgt. C. A. Bannon; P/O. J. R. R. Boyer; P/O. E. A. Davis; Sgt. W. A. Hobson; Sgt. D. W. Howard; F/O. J. J. Jupp; F/O. H. L. Kerr; F/O. L. W. Matthews, D.F.M.; Sgt. F. A. Nichols; Flt. Sgt. A. W. Nicol; P/O. C. W. Pearce; Flt. Sgt. V. R. Polowy; F/O. J. Riddell; Flt. Sgt. J. Ruddell; F/O. G. H. Schlitt; W/O. D. A. Thompson; Flt. Sgt. J. W. H. Vidal.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. J. R. Patterson.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—F/O. D. S. Haddon; F/O. J. H. Mason.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. R. F. Norman.

MISSING.—Flt. Sgt. R. G. Fenton.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. E. F. Edwards; Flt. Sgt. K. J. Watson.

ON PARADE : Air Marshal Sir Leslie Gossage, Chief Commandant of the A.T.C inspecting cadets at the passing-out parade of No. 3 Flight, University of London Air Squadron.

South African Air Force

KILLED ON ACTIVE SERVICE.—Act. Flt. Sgt. D. A. Bates; Act. Flt. Sgt. N. G. Newton; Lt. E. A. Pilke; 2/Lt. E. V. Pinkney; Lt. Van Sittert.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Lt. R. B. Railton.

Casualty Communiqué No. 374

Of the names in this list 125 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. R. G. Cox.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. C. A. Bailey; Sgt. H. G. Bartle; Sgt. L. Bertrand; Flt. Sgt. F. E. Bobby; F/O. C. H. Buchanan; F/O. G. McF. Clarke; Sgt. D. W. F. Cottrell; F/O. A. J. Derrick; Sgt. D. Harrison; Sgt. J. O. Ingram; P/O. A. Massie; Sgt. W. A. Peers; Sgt. D. J. A. Robson; F/O. C. R. G. Rollings; Sgt. F. C. Strevens; P/O. J. H. Wotherspoon.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. L. W. Abbis; Sgt. C. P. Baker; Sgt. F. J. Biddle; Sgt. H. Biggin; P/O. J. B. Binns; Sgt. J. S. Boyce; Sgt. J. A. Bramble; Sgt. A. Burgess; F/O. G. F. Callender; Sgt. J. E. Constable; Sgt. W. W. R. Cook; P/O. R. P. Cryer; Sgt. T. A. Davies; Sgt. G. Davison; F/O. R. J. H. Drummond; Sgt. H. V. Durrant; P/O. C. A. Edwards; F/O. H. Emmerson; Sgt. W. I. Ettle; Sgt. L. R. Evans; Sgt. G. Fisher; Sgt. S. L. Ford; Sgt. S. M. Frost; Flt. Sgt. J. M. Gavagan; Sgt. W. A. Gillanders; Flt. Lt. F. W. Gilmore; Sgt. E. Hall; Sgt. F. J. Hawkins; Sgt. S. Hawkins; Sgt. A. E. Hayes; Sgt. A. R. Helliwell; Sgt. R. Highet; Sgt. M. Hoofe; Flt. Sgt. G. Humphreys; Sgt. B. H. James; Sgt. A. Jarman; Flt. Sgt. J. L. Jeal; Sgt. A. W. Lee; F/O. G. R. Lindsay; Flt. Sgt. J. MacMillan; Flt. Sgt. H. Martin; Sgt. R. S. Metcalf; Sgt. R. Millar; Sgt. B. W. Miller; Sgt. S. Naisner; P/O. R. E. Newman; Sgt. G. C. W. Norton; Sgt. M. E. Owens; Sgt. G. A. Parker; Sgt. G. C. Parritt; Flt. Sgt. J. Pass, D.F.M.; Sgt. G. S. Paterson; Flt. Sgt. W. F. Payne; Sgt. A. L. W. Pond; Sgt. T. L. Portrey; Flt. Sgt. C. P. Probst; Sgt. H. R. Pyle; Sgt. J. L. Readman; Sgt. G. Scott; Sgt. W. H. Stacey; Sgt. K. J. Tagg; F/O. D. H. Thomas; P/O. C. E. Thompson; Sgt. M. P. Tobin; P/O. F. W. Tomlins; Sgt. A. R. Waite; Sgt. K. E. Walters; Sgt. R. W. Warhurst; Sgt. M. Webster; Sgt. T. Whatmough; Flt. Sgt. E. Wright.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. W. A. Jones; Sgt. M. Maddison.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. F. Barrett; P/O. C. G. Cairns, D.F.M.; Sgt. L. D. Hammond; P/O. A. E. Jones; Sgt. Lgr. P. W. Lefevre, D.F.C.; Sgt. H. Martin; Flt. Sgt. J. P. R. Mount; Sgt. S. W. Tupper; P/O. D. L. Wright.

MISSING.—Flt. Sgt. N. W. Allen; Flt. Sgt. J. Anderson; Sgt. A. J. O. Archer; Act. Flt. Lt. P. H. G. Blight; Flt. Lt. R. C. Blockey; Sgt. F. W. Booth; Sgt. H. R. Bowles; Sgt. C. M. Brewster; Sgt. W. J. T. Brodie; Act. Flt. Lt. R. J. Brown; Flt. Sgt. A. Bryce; Sgt. R. Burrell; Sgt. P. E. J. Carmichael; P/O. E. H. Childs; Sgt. L. Clifton; Flt. Sgt. G. T. Cox; Flt. Sgt. H. T. Croft; P/O. S. H. Davis; Sgt. F. M. Forde; Sgt. D. W. Froggatt; Sgt. C. A. Giffard; Sgt. G. T. J. Heath; Sgt. D. F. Hicks; Sgt. L. V. Houlton; Sgt. W. J. Jones; Flt. Sgt. A. B. Kearon; Sgt. A. T. Keel; Sgt. W. R. Kelman; Sgt. J. R. King-Meggat; Flt. Sgt. A. B. Kirkwood; Sgt. D. McKechnie; Sgt. E. J. Martin; Sgt. K. Molyneux; Sgt. R. Montgomery; F/O. A. Moore; Flt. Sgt. A. C. N. Morris; Sgt. C. T. R. Morris; Sgt. R. A. Morris; Flt. Sgt. F. H. Mosen; P/O. J. Nixon; Sgt. W. H. P. Omnet; F/O. A. B. Parr; Flt. Lt. W. J. Pershke; L.A/C. A. G. Pycroft; Sgt. F. S. G. Reeves; Sgt. A. Rutherford-Browne; Sgt. J. Smol'an; Sgt. L. Stone; Sgt. E. J. Sutton; Sgt. D. A. Taylor; Sgt. W. A. Taylor; Sgt. F. E. Tidmas; P/O. J. F. Tosh; Sgt. J. R. Trasler; Sgt. R. Walton; Sgt. D. E. Ward; Sgt. W. R. Weston; Sgt. J. Wilson; Sgt. R. C. Wilson; Sgt. D. Wood; Sgt. A. T. W. Woolhouse; Sgt. W. F. S. Wootten.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. V. F. Dickinson; F/O. E. P. Neary; Flt. Sgt. G. J. Williams.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. C. Cross.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. W. Duxbury.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED ON ACTIVE SERVICE.—L.A/C. C. A. W. Bailey; A/C.2 R. J. Wood.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED ON ACTIVE SERVICE.—Sgt. K. L. Wallace.

DIED ON ACTIVE SERVICE.—A/C.1 N. Charlton; W/O. R. Cross; A/C.1 J. E. Hyde; L.A/C. J. McDowall; L.A/C. W. F. Pearce; A/C.1 J. Ware.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. M. R. Armstrong; Sgt. J. Redman; P/O. H. M. Robinson; Sgt. A. Stephen; Sgt. J. E. Swindin; F/O. T. G. Wilson.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. I. M. Deeley.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. L. R. Brennan; F/O. W. R. Cleland; Flt. Sgt. T. W. R. Jones; Sgt. R. B. Moore; F/O. V. J. Patston; Flt. Sgt. N. D. Pollock; F/O. G. L. T. Smith.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. A. A. Garven; Act. Flt. Lt. C. McT. Shannon.

MISSING, BELIEVED KILLED IN ACTION.—F/O. E. J. Greenwood; Flt. Sgt. J. L. O'Brien.

MISSING.—Flt. Sgt. H. J. Boal; F/O. J. Downes; P/O. S. C. Grugeon; P/O. A. R. Hart; P/O. J. F. MacMillan; P/O. K. C. McPhie; P/O. K. Moreton; F/O. A. D. Riley; Flt. Sgt. L. Thornton.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. P. Hayden.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. F. Martin.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. I. H. Whitson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. L. H. MacDonald.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. R. F. Zwar.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. C. J. Down; W/O. T. W. A. Farrer; F/O. E. L. Wilhelm.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. G. N. Acton; P/O. D. Aiken; F/O. F. C. Culbert; P/O. J. D. B. Hunter; Flt. Sgt. J. F. Male; P/O. B. R. Milligan.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Sgt. R. H. J. Daoust; W/O. B. Davis.

PREVIOUSLY REPORTED WOUNDED OR INJURED IN ACTION, NOW REPORTED DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Lt. W. C. Allan.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. W. H. Andrews; W/O. J. D. Barrie; P/O. J. G. Broadfoot; Flt. Lt. G. J. Chequer; W/O. J. T. R. Corriveau; Act. Flt. Lt. S. R. W. Laine; Flt. Sgt. R. A. McKay; Sgt. J. P. Raymond.

MISSING.—W/O. C. S. Baker; F/O. J. J. Baker; F/O. J. R. Booth; W/O. R. J. Bradley; W/O. J. A. R. Caron; W/O. J. G. Doucet; W/O. J. C. M. Earle; W/O. W. H. Ferris; Flt. Sgt. L. N. Fresque; W/O. J. A. Goyer; W/O. F. E. Halliday; Flt. Sgt. R. E. Johnstone; F/O. E. L. Keeler; P/O. M. Marder; P/O. H. R. D. Patton; Flt. Sgt. C. M. Price; Flt. Sgt. J. L. Piche; Flt. Sgt. R. W. Robertshaw; Flt. Sgt. K. E. Schiedel; Flt. Sgt. G. H. Scott; F/O. W. T. Tranmer; F/O. H. Webb; W/O. G. I. Williams.

DIED ON ACTIVE SERVICE.—W/O. J. A. Fraser.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. W. Robertson.

Royal New Zealand Air Force

KILLED IN ACTION.—W/O. D. C. Hammond.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. A. W. Crozier; Sgt. R. F. Keller; Sgt. J. B. Martyn; Sgt. J. G. Morgan.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. T. E. Browne; F/O. G. A. M. Struthers.

MISSING.—Flt. Sgt. W. J. Swinton.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. R. J. Buckham.

South African Air Force

MISSING.—2/Lt. A. Nelson; Lt. Col. J. N. Robbs, D.F.C.; Lt. N. C. Scott Wimlow; 2/Lt. R. K. Townsend; Capt. N. M. Watermeyer.

KILLED ON ACTIVE SERVICE.—2/Lt. J. S. Ogilvy; Lt. E. R. Scherer.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Act. Cpl. O. J. Schindler.

Casualty Communiqué No. 375

Of the names in this list, 137 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. D. N. Campbell; Sgt. J. R. Colnet; Sgt. H. Findler; F/O. H. J. Hirst; F/O. R. G. Morgan; Sgt. H. Scholes; Sgt. B. R. Wilde.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. H. B. Barrett; Sgt. M. Jones; P/O. G. J. Kerr; P/O. R. E. Leeper; F/O. E. H. McCormack; Sgt. J. L. Osborne; Sgt. W. M. Ward; Sgt. C. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. E. W. Alexander; Sgt. L. V. Anthony; P/O. C. Armstrong; Flt. Sgt. T. J. Bainbridge; Sgt. R. A. Barlow; Flt. Sgt. W. H. Bartlett; Sgt. L. T. Beard; Sqn. Ldr. A. Beck; Sgt. W. H. Bellhouse; Flt. Sgt. T. Bennett; Flt. Lt. L. R. Betts; Sgt. N. Blanchard; P/O. D. C. Bovis; Sgt. R. McH. Boswell; Sgt. J. O. Bradshaw; Sgt. A. E. Brown; Sgt. S. R. Brown; Sgt. R. Bromley; Sgt. A. Burson; Act. Wing Cdr. H. F. Burton, D.S.O., D.F.C.; Sgt. J. S. Callcut; P/O. E. Candy; Act. Flt. Lt. C. E. Coombs; Sgt. K. A. C. Cotton; Act. Wing Cdr. P. T. Cotton, D.F.C.; Flt. Sgt. F. Cuffey; Sgt. B. O. Davies; Flt. Sgt. J. M. Davies; Sgt. W. G. Dawson; Sgt. F. D. Deck; F/O. E. P. Deville; Sgt. J. E. Dickson; F/O. D. V. Edwards; Sgt. G. D. Evans; Flt. Sgt. J. H. Elliott; Sgt. G. E. Evans; Sgt. D. Floyd; F/O. L. G. Flynn; Sgt. J. R. Glendinning; Sgt. P. E. Glover; Act. Wing Cdr. J. Goodhead; F/O. D. M. Grant; Sgt. R. A. Green; P/O. E. Griffiths; Act. Sqn. Ldr. The Hon. B. Grimston, D.F.C.; P/O. R. R. Hale; Sgt. W. Hallows; Sgt. C. W. Hartin; Sgt. W. A. Hobbis; P/O. H. E. Howsam; Flt. Sgt. H. Humphreys, D.F.M.; Sgt. J. Imms; Flt. Sgt. S. P. Jenkins; F/O. R. J. Johnson; Sgt. R. A. Kennedy; F/O. C. P. King, D.F.M.; Sgt. D. J. Kingsnorth; Sgt. A. O. Lewis; Sgt. C. A. Long; Sgt. R. E. Longster; Sgt. G. Luff; Sgt. H. J. Lyro; Flt. Sgt. J. F. McLuskey; P/O. I. L. McDonnell; Sgt. F. M. Mazin; Sgt. A. D. Moore; P/O. R. E. Moore, D.F.M.; Sgt. G. J. Morrice; Sgt. G. C. Mortimer; Sgt. A. E. Muir; F/O. E. R. Muller-Rowland; Sgt. D. Murphy; Sgt. J. F. Mustchin; Sgt. H. Nash; Sgt. J. A. T. Newton; F/O. F. D. Norton; F/O. M. H. Oddie; F/O. A. C. Palmer; Sgt. C. W. Payne; Sgt. G. H. W. Peach; Sgt. R. J. Perrin; P/O. G. W. Pollard; Sgt. A. E. Ponsford; Sgt. E. B. Potter; Sgt. L. F. Price; Sgt. G. W. Priest; Sgt. R. D. Pryde-Watson; Sgt. T. J. Ridd; Sgt. A. A. Rush; Sgt. R. S. Sabell; Sgt. C. Sampson; F/O. J. W. Simpson; P/O. N. B. Smythe; P/O. C. F. J. Sprack, D.F.M.; Sgt. R. A. Stringer; Sgt. E. J. Stuart; P/O. W. Stuckey; F/O. P. D. Swallow; Act. Flt. Lt. W. M. Theobald; F/O. E. A. Tilbury; F/O. J. W. Verney; Sgt. R. C. H. Webb; Sgt. F. A. Whitehead; F/O. A. J. Willcock; Sgt. E. Williams; Sgt. P. Williams; P/O. W. H. Wood; F/O. F. L. Yates; Act. Group Capt. R. G. Yaxley, D.S.O., M.C., D.F.C.

WOUNDED OR INJURED IN ACTION.—F/O. T. Prendergast.

MISSING, BELIEVED KILLED IN ACTION.—F/O. R. H. Edmeades.

MISSING.—P/O. J. N. S. Ashton, D.F.M.; F/O. E. Bell; Sgt. S. Booth; Sgt. S. J. A. Boon; F/O. J. D. Bowmer; Sgt. D. A. Brooks; Sgt. J. A. Brown; Sgt. J. G. Campbell; Act. Sqn. Ldr. R. D. Campling, D.F.C.; Sgt. W. J. Cant; F/O. G. D. Carroll; Sgt. H. Chalton; Act. Flt. Lt. R. J. H. Clayton; Sgt. R. D. Clement; Flt. Sgt. T. C. Climpson; Flt. Sgt. G. E. Combe; Act. Sqn. Ldr. T. C. Cooke, D.F.C., A.F.C., D.F.M.; F/O. G. A. A. Croskell; P/O. B. S. Cubbage; Flt. Sgt. P. Ellenbogen; Flt. Sgt. K. R. Farmer; F/O. R. B. Gordon; F/O. L. J. Gornall; Act. Wing Cdr. E. J. Gracie, D.F.C.; Sgt. J. E. Harling; Sgt. R. T. B. Howe; W/O. S. A. Lagdon; Act. Flt. Lt. D. F. Langham; Sgt. A. W. Lawrie; F/O. R. W. Lewis, D.F.C.; Sgt. S. Long; Flt. Sgt. P. R. Mann; Sgt. K. S. Milford; Sgt. F. Morgan; Sgt. I. G. Morgan; F/O. S. L. Page; Sgt. P. T. Parke.; Sgt. J. E. B. Pye; W/O. C. E. Quinn, D.F.M.; Sgt. K. W. Radford; F/O. J. S. Reed; Sgt. A. R. Saunders; P/O. H. M. Scott; Flt. Lt. F. J. Sercombe; Sgt. A. J. Sims; Sgt. R. F. Sranner; Sgt. P. T. Thompson; F/O. A. J. Tiddy; F/O. I. A. Unwin; Flt. Lt. H. V. C. Webb; F/O. A. B. Whithecombe; Sgt. G. S. Woodrow; Act. Flt. Sgt. C. H. L. Wright.

KILLED ON ACTIVE SERVICE.—Sgt. J. E. Armitage; Sgt. B. Bagley; Sgt. F. C. Ball; Flt. Sgt. W. J. B. Bishop; Sgt. M. J. Breen; Sgt. J. Carless; Sgt. C. Carr; Sgt. H. D. Clough; Sgt. P. H. Earwaker; Sgt. R. E. Green; Sgt. E. L. Gros; Sgt. S. O. Hill; Sgt. M. Hole; Sgt. I. G. Howells; Sgt. C. A. Irvine; Sgt. C. King; Sgt. C. G. Magness; Sgt. E. D. Moore; Sgt. T. H. Padmore; Sgt. P. F. Palmer; Sgt. H. G. Pudduck; Sgt. L. Purvis; Flt. Sgt. B. E. Smith; Sgt. J. C. Speechly; Sgt. R. H. D. Watson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. B. K. Barry; Sgt. L. A. Pestell.

WOUNDED OR INJURED ON ACTIVE SERVICE.—W/O. E. F. Crosswell; Sgt. P. G. R. Edwards; Sgt. J. C. Enoch; Sgt. L. R. B. Lee.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. P. R. Cross; Sgt. R. Hemingway; Sgt. A. J. Welstead.

DIED ON ACTIVE SERVICE.—Cpl. A. V. Allen; Cpl. H. W. Bailey; A/C.2 A. H. Bishop; Cpl. F. Booth; Act. Flt. Lt. R. A. C. V. Burnett; Cpl. W. G. Daltry; Cpl. D. K. Evans; A/C.2 E. C. Gerosa; Act. Wing Cdr. F. V. Harrison; L.A/C. A. E. Horwell; Sgt. W. S. Ingram; L.A/C. D. W. Kiff.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. G. S. Mills.

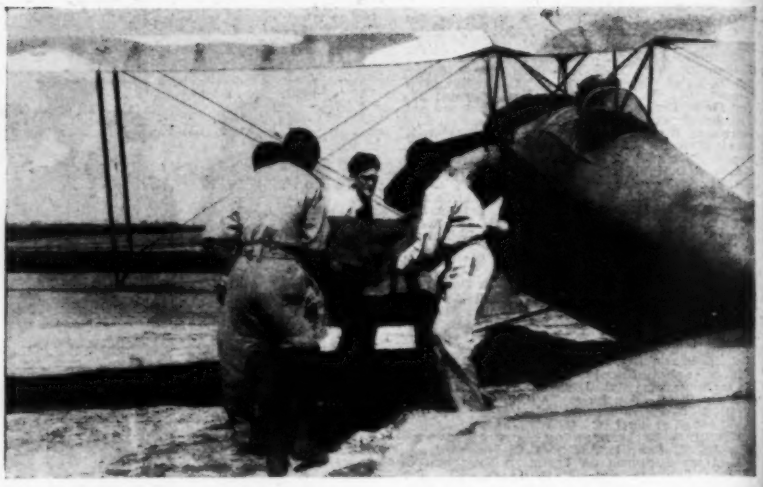
PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. D. S. Lister; Flt. Sgt. J. M. Stone; Flt. Sgt. D. McN. Thomson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. T. H. Doran; Flt. Sgt. M. L. Eastgate; Flt. Sgt. I. S. Gordon; P/O. N. R. Gyles; Flt. Sgt. N. C. Keeffe; W/O. J. C. Kelly; Flt. Sgt. R. S. King; Flt. Sgt. A. E. Lewis; Sqn. Ldr. T. W. Patrick; Flt. Sgt. R. L. Robertson.

MISSING.—Sgt. E. J. Lever; Flt. Sgt. V. A. McCarthy; F/O. J. W. McDonald.

KILLED ON ACTIVE SERVICE.—F/O. J. F. Doery; Flt. Sgt. R. T. Hewetson; Flt. Sgt. A. F. Sherry.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. J. C. Munro; P/O. A. T. Richards.



STILL DOING GOOD WORK: A De Havilland Fox Moth of 1931 vintage carrying wounded on the Arakan front in Burma.

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. J. H. Love; Flt. Sgt. L. E. Moriarty.

WOUNDED OR INJURED IN ACTION.—Sgt. R. C. Drinkwater.

MISSING.—F/O. L. A. Arner; W/O. J. G. Bachand; F/O. R. L. Beattie; F/O. W. F. Bender; W/O. R. T. Currie; F/O. R. E. Durnford; P/O. L. D. Gosney; Flt. Sgt. J. J. Hughes; F/O. E. H. Hutcheson; F/O. J. H. Irwin; Flt. Sgt. A. M. Johnston; Flt. Sgt. T. L. Jordan; F/O. R. W. Kemp; Flt. Lt. D. D. Laidlaw; W/O. J. E. J. B. G. Lussier; F/O. J. A. MacDonald; W/O. J. L. A. Madden; Flt. Sgt. A. S. Miller; Sgt. R. W. Pratt; F/O. A. E. Reid; F/O. W. E. Rempel; W/O. E. G. Richards; W/O. L. Strickland; Flt. Sgt. J. A. Taylor; Sgt. R. C. Woods.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Flt. Lt. H. K. McAvity.

KILLED ON ACTIVE SERVICE.—Sgt. W. B. Blakely; Sgt. D. McV. Carkner; Flt. Lt. J. R. Edgar; F/O. W. D. Harrison.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. W. V. Hall.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. H. V. P. Hopkins.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. A. E. Coutts; W/O. N. H. Lavin; Flt. Sgt. J. D. D. Mackie; Sgt. A. C. A. MacPhail; Flt. Sgt. D. H. Northcoat; Sgt. H. J. Oxley; Sgt. F. A. Partridge; P/O. E. R. Strang; Flt. Sgt. S. R. Thornley.

MISSING.—P/O. P. R. Watt.

KILLED ON ACTIVE SERVICE.—Flt. Lt. S. R. O. Richmond; F/O. D. R. Wilkes.

South African Air Force

MISSING.—Lt. E. F. Adams; Lt. F. Bluck; Lt. W. C. Botha; Lt. W. Kempen; 2/Lt. R. E. McWilliams; Flt. Sgt. G. J. Stone.

DIED ON ACTIVE SERVICE.—Capt. P. E. Saunders.

Official Correction

Casualty Communiqué No. 367.

Under "MISSING" for Sgt. C. Mason read Flt. Sgt. C. Mason